

***United States Court of Appeals
for the
District of Columbia Circuit***



**TRANSCRIPT OF
RECORD**

JOINT APPENDIX

IN THE
United States Court of Appeals
FOR THE DISTRICT OF COLUMBIA CIRCUIT

NO. 19083

CRAWFORD B. MURTON and VESUVIUS
CRUCIBLE COMPANY, Appellants,

v.

DAVID L. LADD, Commissioner of Patents,
Appellee.

Appeal From a Judgment of the United States District
Court for the District of Columbia

United States Court of Appeals
for the District of Columbia Circuit

FILED FEB 8 1965

Nathan J. Paulson
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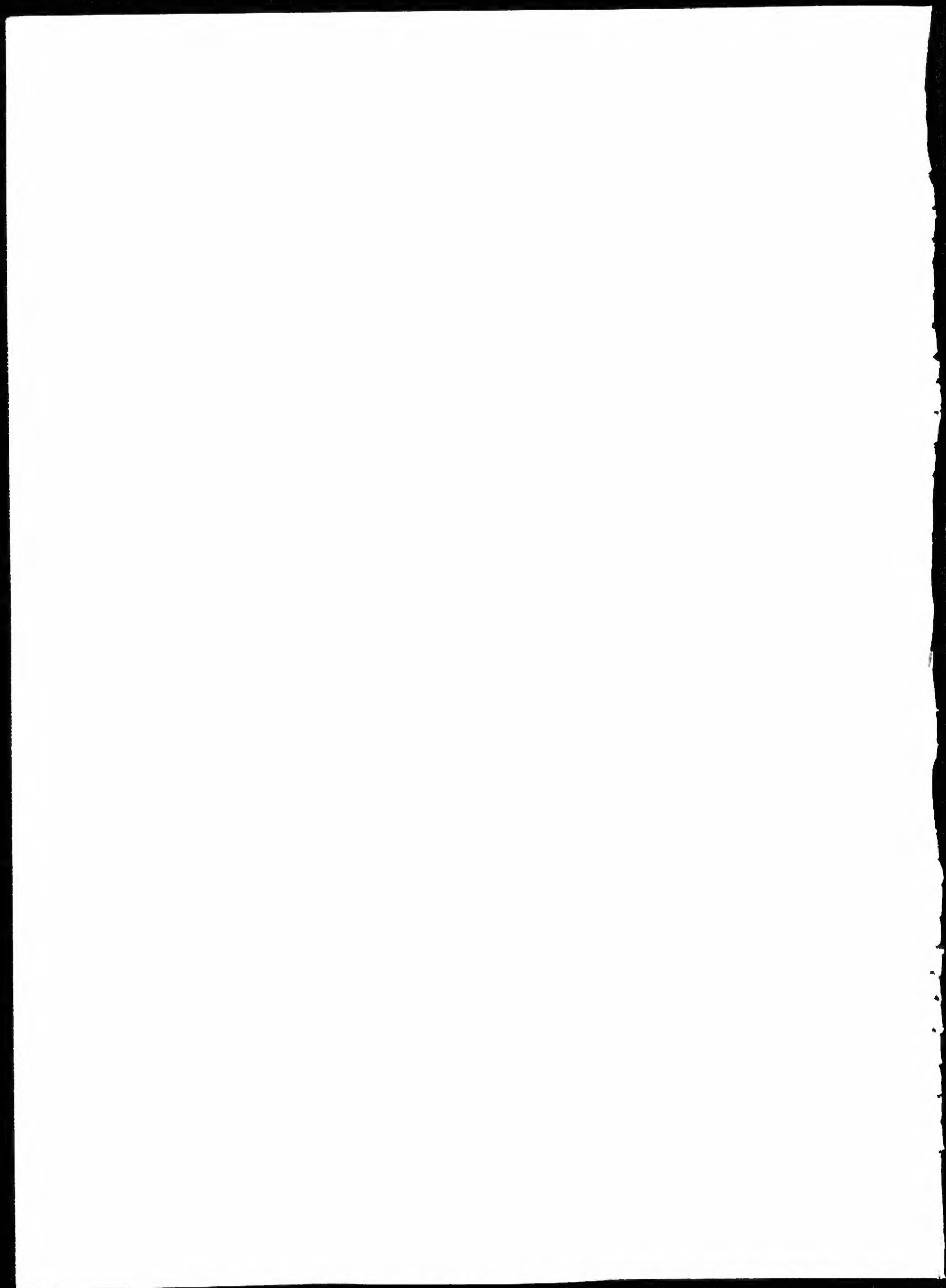


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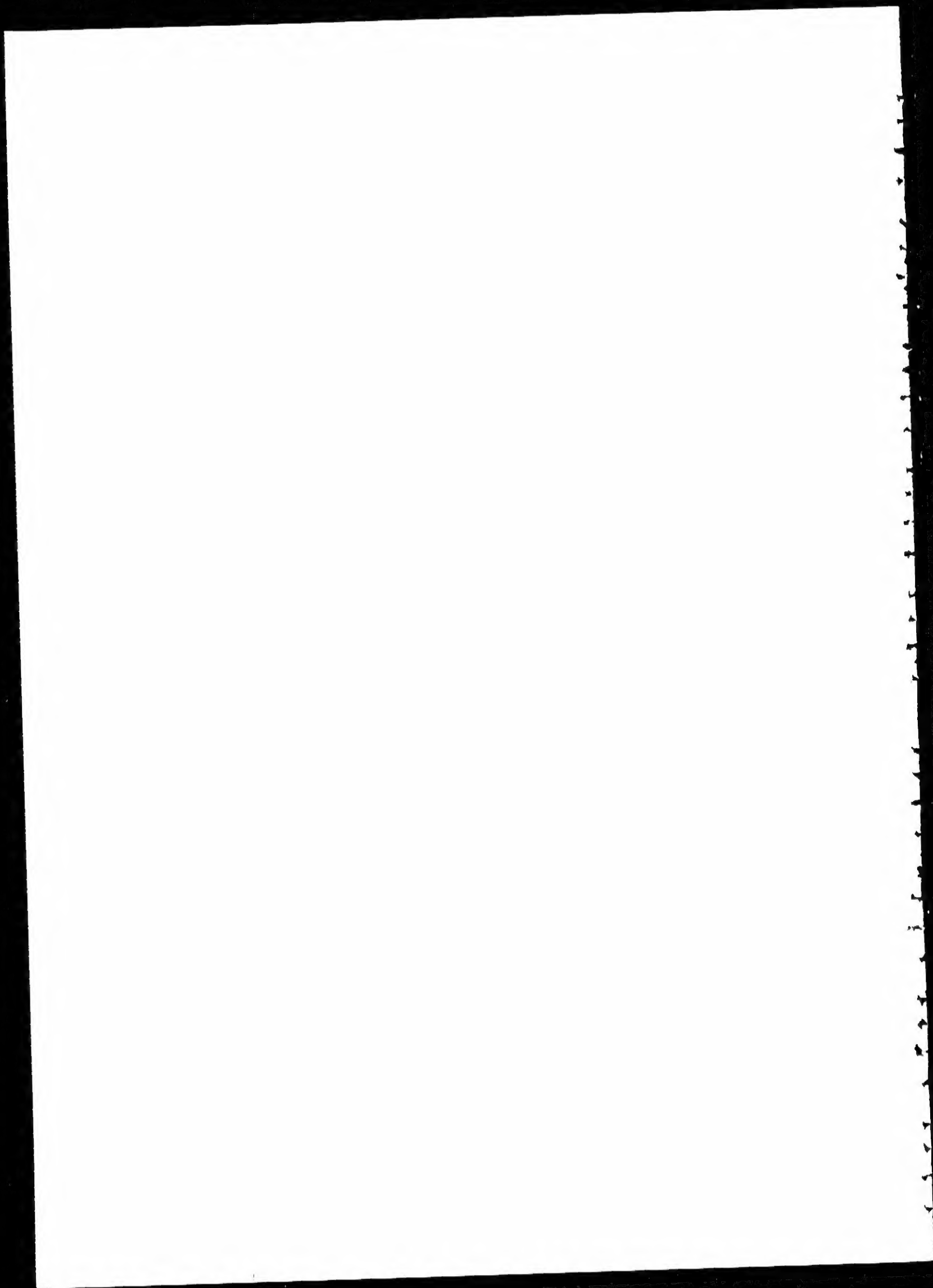
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JOINT APPENDIX

**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA**

CRAWFORD B. MURTON,
Hochhaus AM Steinberg 69,
Monchen-Gladbach, West Germany,
and

VESUVIUS CRUCIBLE COMPANY
2216 Palmer St.,
Swissvale,
Pittsburgh 18, Pennsylvania,
Plaintiffs,

v.

DAVID L. LADD,
Commissioner of Patents,
Defendant.

Civil Action
No. 3876-62

Relevant Docket Entries

1962

Dec. 13 Complaint, appearance. filed
Dec. 13 Summons, copies (3) and copies (3) of Com-
plaint issued Ser 12/14/62 DA ser 12/17/62.
AG ser 12/20/62

1963

Jan. 30 Answer of deft to complaint; c/m 1/29/63; ap-
pearance of C. W. Moore, Solicitor. filed
Jan. 30 Calendared (AC/N) (N)

1963

Dec. 18 Hearing begun; concluded and taken under advisement; both counsel to submit briefs and proposed findings of fact and conclusions of law and proposed order. (Rep: J. Maher)
Jackson, J.

1964

June 25 Trial brief of plaintiff. filed
June 25 Brief of plaintiff. filed
June 25 Brief of defendant. filed
June 25 Memorandum opinion in re: finding for defendant (N) Jackson, J.
June 25 Order dismissing complaint with costs vs. plaintiff (N) Jackson, J.
June 25 Transcript of proceedings, pp 1 to 133 incl. Rep: J. Maher) filed
Sept. 24 Order denying plaintiffs' petition for reconsideration. (N) Jackson, J.
Nov. 12 Notice of appeal by plttfs from order of Sept. 24, 1964; deposit \$5.00 by Michael; copy mailed to C. W. Moore, Solicitor.

Complaint

(Filed December 13, 1962)

To the Honorable the Judges of the United States District Court for the District of Columbia:

1. This is a civil action against defendant, the Commissioner of Patents, for an adjudication that plaintiff Vesuvius Crucible Company is entitled to receive a patent for the invention of plaintiff Crawford B. Murton as specified in his claims involved in a decision of the Board of Appeals dated October 22, 1962, from which no appeal has been taken to the United States Court of Customs and Patent Appeals, and authorizing defendant to issue such patent on compliance with the requirements of law. This Court has jurisdiction by virtue of Title 35, Section 145, of the United States Code and Rule 304 of the Rules of Practice of the United States Patent Office in Patent Cases (37 C.F.R. §1.304—Title 35, Appendix I, p. 743, of the United States Code).

2. Plaintiff Crawford B. Murton (hereinafter called "MURTON") is a citizen of the United States now temporarily residing in West Germany. Plaintiff Vesuvius Crucible Company, (hereinafter called "VESUVIUS") is a Pennsylvania corporation having its principal place of business at Swissvale, Pennsylvania.

3. Defendant, David L. Ladd, is Commissioner of Patents of the United States.

4. Plaintiff MURTON on September 8, 1958, filed in the United States Patent Office in due form as required by law an application for a United States patent on improvements made by him in a stopper for a ladle or similar receptacle, which application was assigned Serial No.

759,670. By an assignment executed September 5, 1958 (contemporaneously with execution of said application), and recorded in the United States Patent Office September 23, 1958, at reel 558, frame 155, plaintiff MURTON assigned to plaintiff VESUVIUS the entire right, title and interest in and to said application and the inventions and improvements therein disclosed, and said entire right, title and interest has continuously resided and now resides in plaintiff VESUVIUS.

5. Said patent application was examined and acted on and amended, and the following claim was allowed by the examiner:

8. A stopper for a ladle or similar receptacle comprising a refractory head having a well extending downwardly thereinto, a rod having a lateral projection at its bottom inserted downwardly into the well, the well being internally threaded, and externally threaded means threaded into the well into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well whereby to attach the rod to the head.

6. The remaining claims as amended were finally rejected. The finally rejected claims are the following:

2. A stopper for a ladle or similar receptacle comprising a refractory head having a well extending downwardly thereinto, a rod having a lateral projection at its bottom inserted downwardly into the well and means separate from the head also inserted downwardly into the well above the lateral projection at the bottom of the rod into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well and connected with the head whereby to attach the rod to the head, said means being the sole means overlying the lateral projection at the bottom of the rod.

5. A stopper for a ladle or similar receptacle comprising a refractory head having a well extending downwardly thereinto, the well having a portion of its wall relatively remote from its bottom of smaller transverse dimension than a portion of its wall less remote from its bottom, forming a shoulder facing toward the bottom of the well, a rod having a lateral projection at its bottom inserted downwardly into the well and means separate from the head inserted downwardly into the well upon insertion of the rod interposed between said shoulder and the lateral projection at the bottom of the rod blocking withdrawal of the rod from the well whereby to attach the rod to the head.

7. A stopper for a ladle or similar receptacle comprising a refractory head having a well extending downwardly thereinto, a rod having a lateral projection at its bottom inserted downwardly into the well and cooperating preformed elements fitting together to at least largely surround the rod above the lateral projection thereon applied to the head into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well whereby to attach the rod to the head.

9. A stopper for a ladle or similar receptacle comprising a refractory head having a well extending downwardly thereinto, the well having at a portion of its periphery a shoulder facing toward the bottom of the well, a rod having a lateral projection at its bottom inserted downwardly into the well and means separate from the head also inserted downwardly into the well into position to overlie at least a portion of the lateral projection at the bottom of the rod and turned to a position in which a part thereof underlies said shoulder to block withdrawal of the rod from the well and thereby attach the rod to the head.

12. Means for application to a ladle stopper rod having a lateral projection at its bottom to form a ladle stopper, said means comprising a refractory

head having a well extending downwardly thereinto having a downwardly facing shoulder and means separate from the head applied to the head and rod downwardly through said well into position to underlie at least a portion of said shoulder and overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well whereby to attach the rod to the head.

13. The combination of the means defined by claim 11 and additional means holding said head and said separate means against substantial relative movement to insure maintaining the rod attached to the head.

7. Claim 11 of said application which is referred to in the above claim 13 was cancelled but prior to cancellation read as follows:

11. Means for application to a ladle stopper rod having a lateral projection at its bottom to form a ladle stopper, said means comprising a refractory head having a well extending downwardly thereinto and means separate from the head applied to the head and rod downwardly through said well into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well whereby to attach the rod to the head.

Upon the cancellation of claim 11 claim 13 should have been rewritten in independent form but this was inadvertently overlooked. Plaintiffs propose to rewrite claim 13 in independent form immediately upon a finding by this Court that that claim is patentable in substance.

8. For the convenience of the Court claim 13 rewritten in independent form is here set forth:

13 (in independent form). Means for application to a ladle stopper rod having a lateral projection at its bottom to form a ladle stopper, said

means comprising a refractory head having a well extending downwardly thereinto, means separate from the head applied to the head and rod downwardly through said well into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod upwardly out of the well whereby to attach the rod to the head and additional means holding the head and said first mentioned means against substantial relative movement to insure maintaining the rod attached to the head.

9. Appeal was taken to the Board of Appeals as to the above identified finally rejected claims, and on October 22, 1962, the Board of Appeals rendered a decision affirming the decision of the examiner insofar as those claims were rejected on the Bacon United States patent No. 1,719,795, granted July 2, 1929, and the Sears United States patent No. 1,843,175, granted February 2, 1932. Whereas the examiner had rejected claim 13 as indefinite as being dependent on a previously cancelled claim the Board of Appeals did not find claim 13 indefinite but, recognizing that the rewriting of claim 13 in independent form had simply been inadvertently overlooked, considered that claim on its merits in connection with cancelled claim 11 as though it had been rewritten in independent form as set forth in paragraph 8 and found it not patentable over the Bacon and Sears patents. The issue before this Court is whether claims 2, 5, 7, 9 and 12 as set forth in paragraph 6 and claim 13 as set forth in paragraph 8 are patentable over the Bacon and Sears patents.

10. The action of the Board of Appeals in holding such claims 2, 5, 7, 9, 12 and 13 unpatentable was erroneous; such claims are patentable and a patent should issue thereon.

PLAINTIFFS PRAY for a judgment that the above identified claims 2, 5, 7, 9, 12 and 13 are patentable and that plaintiff VESUVIUS is entitled to receive a patent thereon and authorizing defendant to issue such patent on compliance with the requirements of law, and for such other and further relief as is just and proper in the premises.

Answer to Complaint

(Filed January 30, 1963)

To the Honorable the Judges of the United States District Court for the District of Columbia.

1. The defendant admits the allegations of paragraph 1 of the complaint.

2. The defendant asserts that he is without knowledge or information sufficient to form a belief as to the truth of the allegation that plaintiff, Crawford B. Murton, is now temporarily residing in West Germany. Otherwise, however, the defendant admits the allegations of paragraph 2 of the complaint.

3, 4, 5, 6. The defendant admits the allegations of paragraphs 3, 4, 5, and 6 of the complaint.

7. The defendant asserts that he is without knowledge or information sufficient to form a belief as to the truth of the allegations that the rewriting of claim 13 in independent form was inadvertently overlooked and that plaintiffs propose to rewrite claim 13 in independent form immediately upon a finding by this Court that that claim is patentable in substance. Otherwise, however, the defendant admits the allegations of paragraph 7 of the complaint.

8. The defendant denies that claim 13 is accurately and properly rewritten in independent form in paragraph 8 of the complaint.

9. The defendant admits that appeal was taken to the Board of Appeals as to the finally rejected claims identified in paragraph 6 of the complaint, and that on October 22, 1962, the Board of Appeals rendered a decision affirming the decision of the Examiner. Otherwise, however, the defendant denies the allegations of paragraph 9 of the complaint.

10. The defendant denies the allegations of paragraph 10 of the complaint.

FURTHER ANSWERING, the defendant asserts that the plaintiffs are not entitled to a patent containing any of claims 2, 5, 7, 9, 12, and 13 of the application involved in this civil action, for the reasons given and in view of the references cited in the final rejection of April 15, 1960, the Examiner's action of October 26, 1960, the Examiner's answer of June 23, 1961, and the decision of the Board of Appeals in that application. Profert hereby is made of copies of the said final rejection, action, answer, decision and references.

Testimony for Plaintiffs (Appellants)

TESTIMONY OF WALTER T. SERGY.

[53]

DIRECT EXAMINATION*By Mr. Hoopes:*

Q. Please state your name. A. My name is Walter T. Sergy.

Q. What is your age? A. I am forty-one.

Q. Where do you reside? A. I reside in Monroeville, Pennsylvania, a suburb of Pittsburgh.

Q. What is your occupation? A. I am the assistant superintendent of the open hearth department, Jones & Laughlin Steel Corporation, Pittsburgh Works.

Q. Is that Jones & Laughlin Steel Corporation? A. That is correct.

Q. What is Jones and Laughlin Steel Corporation? A. Jones and Laughlin is one of the largest steel corporations in this country.

Q. Please state your education and professional experience. A. In 1943 I graduated from Lafayette College with a Bachelor of Science Degree in Metallurgical Engineering. [54] Shortly thereafter I was employed by the Battelle Memorial Institute for Research in Columbus, Ohio.

Shortly thereafter, in 1944, I entered the service in the United States Navy and was discharged in 1946 as a lieutenant, junior grade, Ordnance.

I started with Jones & Laughlin in 1946 as a research engineer.

In 1949 I was promoted to steel works metallurgist of the Pittsburgh Works.

My duties included quality control standards in the blast furnaces, the open hearth and the blooming mills; and the maintenance of quality standards in steel-making and the subsequent pouring of ingots.

My duties also consisted of tracing of defects in semi-finished steel. This was related to pouring.

In 1951 I was made general foreman of the open hearth in the bessemer department and was responsible for that operation.

In 1952 I was made assistant general foreman of number 4 open hearth shop.

In 1953 I was made general foreman of this shop.

In 1955 I was made assistant superintendant of the open hearth department, with broad administrative duties related to steel-making practice, raw material procurement, costs, [55] safety, including specific responsibility for the pouring of molten steel. This shop has the capacity of three-million tons per year.

I am a member of Tau Beta Pi Honorary Engineering Fraternity.

I have studied at the University of Pittsburg and Carnegie Tech for two years.

I am a member of the American Institute of Mining and Metallurgical Engineers; and I have written several technical papers.

Q. Have you studied the patent application here-involved, Murton Application, Serial Number 759670, plaintiffs' exhibit number 1? A. Yes, I have.

Q. Have you had actual experience in the use of the Murton ladle stopper in the tapping of open hearth steel furnaces and teeming or pouring of the molten steel into ingot molds? If so, indicate to the Court in a gen-

eral way the extent of such experience? A. My experience with this stopper head encompasses approximately twenty-thousand heats, which include as much as eight-million tons of steel.

Q. Have you also had actual experience in use of other types of ladle stoppers in the tapping of open hearth steel [56] furnaces and teeming of the molten steel into ingot molds? A. Yes, I have had extensive use with stoppers other than Murton.

Q. How many tons of molten steel are produced in a single heat in a single one of the large open hearth furnaces at the South Side plant of Jones & Laughlin Steel Corporation at Pittsburg? A. Approximately 350 tons per heat.

Q. Are those furnaces tapped into ladles and equipped with ladle stoppers such as you have referred to? A. Yes, they are.

Q. Please describe to the Court the furnace tapping operation; and in so doing you may refer to the chart, plaintiffs' exhibit number 2. And please wait just a moment until I put the chart up.

The Court: Do you wish the witness to go down and indicate with the pointer as he talks?

Mr. Hoopes: Would you like to have the witness come down, Your Honor?

The Court: I am asking you if you want him to go down.

Mr. Hoopes: I thought that as the witness testified I would point to the parts that he was referring to.

The Court: Well, that is the same thing.

[57] *Mr. Hoopes:* Now you may proceed.

The Witness: A ladle is positioned behind the furnace to accept the molten steel. This is ladle number 2. The heat of steel is approximately 350 tons. The ladle itself weighs approximately 110 tons. It has the capacity in excess of 1700 cubic feet, which is about the size of an average living room.

This ladle is equipped with a bottom pour nozzle. This is indicated as 3. Through this orifice or nozzle steel is discharged from the ladle into ingot molds at the proper time.

This nozzle is closed by a stopper. Such stopper is the subject of this particular suit. The ladle stopper has a stopper head 4 which closes the nozzle.

The steel stopper rod is connected to the head and extends upward. At the upper end it is connected to a mechanism outside of the ladle for raising and lowering the stopper rod. This is accomplished by the rigging shown on the outside which is actuated by a lever 7 which is handled by a man.

The rod 5 moves up to raise the stopper head and allow the flow of metal.

Rod 5 moves down to lower the stopper head to shut off the metal.

[58] The diameter of the bore of the nozzle is approximately 2-inches.

The head has a maximum diameter of 7-inches. At its lower end, however, it is shaped so to fit into the pocket that will be formed around the top of the nozzle.

The stopper head is made of fire clay and graphite and it is a highly heat-resistant refractory material.

The stopper rod is made of steel. It is 2-inches in diameter, approximately 16-feet long and weighs approximately 200 pounds.

The steel stopper rod 5 is protected by sleeves noted as 6 which are dispersed about the rod. These sleeves weigh approximately 550 pounds.

When the furnace is tapped by means of an explosive which opens a hole behind the furnace, the molten steel travels out of the furnace along the spout and into the ladle.

The temperature of that steel is approximately 2900 degrees Fahrenheit. The tap will take anywhere from 10 to 15 minutes; and the contents of the ladle will contain approximately 350 tons of molten steel.

From the beginning of the tap the stopper head is subjected to the intense heat of the steel and is terrifically shocked thermally by the molten steel.

The stopper is relatively cold, on the order of [59] 200 to 250 degrees. This will depend on the temperature of the ladle in which it is inserted.

The Court: When you call it tap, is that just the length of time it takes to fill one of those molds?

The Witness: It is the length of time that it takes the steel to come out of the furnace.

The Court: All of it?

The Witness: Into the ladle. Yes, the hole in the furnace is at the bottommost portion of the furnace.

The Court: Are these molds moved along a belt of some kind?

The Witness: No, they are resting on railroad cars.

The Court: I see.

The Witness: And they are moved by a locomotive engine at the proper time. The man is standing on a

platform. The molds are resting on buggies, as we call them, and the buggies are on the standard gauge railroad tracks.

The Court: I see.

By Mr. Hoopes:

Q. At the time the molten steel is teemed into the ingot molds, are the ingot molds moved along the track or do they stand still? A. They stand still.

Q. Then after the ingot molds are filled they are taken [60] away; is that correct? A. Yes, they are taken for subsequent refinement.

Q. During the course of my opening statement to the Court I was asked about the pre-heating of the ladle stopper, you will recall. Will you explain about the pre-heating of the ladle stopper? A. As you noted in the film, great care is taken to make this stopper up, because it is very important in its application. With the fine workmanship that has been demonstrated, it takes an equal amount of care to handle this stopper from that point. This stopper, after it is assembled, is hung up to cure, so to speak, for approximately 72 hours in a heated chamber that approaches a temperature of 300 to 350 degrees. And the stopper, after it has been thoroughly dried, which is the purpose of this particular oven, it is then handled with equally great care and inserted into the ladle; so that the temperature of this rod is about 275 to 300 degrees when it is taken out and placed in the ladle. And its subsequent temperature would depend on the heat of the ladle itself. So for practical purposes the rod would be approximately 200 degrees.

Q. And the temperature of the molten steel discharged into the ladle is what? A. The temperature of

the steel entering that ladle [61] from the furnace is approximately 2900 degrees Fahrenheit; and it subjects the stopper to intense thermal shock causing cracks and fissures to occur in those refractories.

Q. Now you have described the tapping of the open hearth furnace into the ladle. What is the next operation after the ladle has been filled with steel from the open hearth furnace? Let me first ask you what the yellow color on plaintiffs' exhibit number 2 indicates?

A. The yellow color does indicate the contents of steel that is in the ladle.

Q. And what is the red color, what does that represent? A. The red color designates the slag.

Q. All right. Now the ladle having been filled with steel, please explain the next operation? A. The next operation is portrayed right there on that exhibit; and it has been shown in the film that the ladle is picked up by an overhead crane and carried to a position near the first of a long series of ingot molds; and it is spotted at the first ingot mold. There may be 60 to 70 such molds in one continuous slide. The ingots may be as tall as 62-inches and may reach up to as much as 100-inches in this particular shop. They may weight anywhere from 5 tons to 15 tons each. That is for each ingot.

The ladle is positioned so that the nozzle is [62] centered over the first of a long series of molds. The stopper rod is raised to permit the flow of material, to permit the flow of steel into the mold.

The stopper is lowered to shut it off when the mold is filled. And then the crane moves along and then is positioned over the next ingot mold, etc., until the contents of the ladle is thoroughly drained.

The actuation of the rigging, as shown on that exhibit, is by a man. This can also be done by a power

unit, by a hydraulic unit that is connected to the rigging, and the force to that rigging applied by a hydraulic manner.

It is necessary to thrust the ladle stopper down with great force to close the nozzle. Steel tends to solidify around the top of the nozzle and tends to interfere with the nose of the stopper head from sealing directly down on the nozzle to close off the 2-inch orifice. The head is repeatedly jammed down to shape that semi-solid mass into a pocket so that the stopper head can very effectively close off the top of that nozzle.

This occurs at a time when the stopper head has been subjected to a great deal of thermal stress. Compounded on that thermal stress is this mechanical stress that continues throughout the pouring of the steel. This is at a time when the head is least able to endure such a thrust.

[63] Q. What, if anything, did you have to do with the motion picture, plaintiffs' exhibit number 13, shown to the Court at the beginning of the trial? A. This film was produced under my supervision. It shows the assembly of a Murton Stopper. It shows the tapping of an open hearth furnace and subsequent pouring of that steel into ingot molds.

Q. Where was the motion picture taken? A. This motion picture was taken at number 4 open hearth shop of Jones & Laughlin Steel Corporation and pretty much reflects a normal operation.

Q. Whose voice is on the sound track of the motion picture? A. That voice is mine.

Q. Did a picture of yourself appear in the motion picture? A. I appeared very briefly near the end of the picture.

Q. A verbatim transcript of the sound track of the motion picture has been marked as plaintiffs' exhibit number 14. Do you vouch for the correctness of the transcript? A. Yes, I do.

Q. What facts brought out by the motion picture do you wish to emphasize particularly for the Court's consideration? A. I wish to emphasize again the temperature extremes [64] to which the stopper head is subjected. It is subjected initially to the intense thermal shock of the molten steel which takes place very quickly during tap and continues until the process has been completed.

Due to the fact it is necessary to jam this stopper head repeatedly down into this well to shut off that nozzle, this is additional mechanical stress over and above the thermal stress; and this occurs when the head is in its least, or its most vulnerable position, where it has been softened and has been exposed to the intense heat of the molten steel. It is thus under such conditions susceptible cracking and failure.

Q. Now please look at the chart, plaintiffs' exhibit number 9, of the Bacon Patent, Number 1719795, one of the references cited against Murton. The Bacon Patent shows a ladle stopper having a stopper head 5 and protective sleeves 4 around the stopper rod above the stopper head.

What supports the sleeves 4? A. The sleeves 4 are supported directly by the stopper head 5.

Q. Now please look at the chart, plaintiffs' exhibit 7, of the Sears Patent, Number 1843175, a second reference cited against Murton. The Sears Patent shows a stopper having a head 25 and protective sleeves 21 above the head. What supports [65] the sleeves 21 in Sears?

A. These sleeves are supported also by the head. In this case head 25.

Q. Now please look at the chart, plaintiffs' exhibit 11, which is the chart of the British Patent Number 12,291 of 1904, which is the third reference cited against Murton. It shows a stopper head D mounted on a stopper rod E, but does not show any sleeves.

Will sleeves be used with a structure as shown in the British Patent and, if so, how will they be supported?

A. It is obvious to me that sleeves must be used to dispose about the rod and protect it from the heat of the molten metal that it will pour. These sleeves will also be supported by the head D. However—

Q. Is that all? A. Yes.

Q. Do I correctly understand that in all three of the references cited against Murton the sleeves would bear on the stopper head? A. Yes, in all three cases the sleeves would bear on the stopper head.

Q. What is the practical result or effect of the sleeves bearing on the stopper head? A. Every time the stopper is jammed down into the nozzle [66] the inertia of the sleeves causes a mass or weight to come to bear on the sleeves which then bears on the head which then subjects the head to acute possibility of failure. The head stops at the nozzle on the downward thrust. The sleeves continue to apply a thrust down onto the head. This is at a time when the head is most vulnerable to receive that thrust.

Q. Have you experienced failure of a stopper head in a ladle in which the sleeves protecting the stopper head were supported directly on the stopper head? A. Yes, I have.

Q. What happened? A. When the sleeves are supported directly on the stopper head this causes very

pronounced failure. The failure of a stopper head results in an uncontrollable stream of metal coming out of the bottom of this ladle. When we remember that this ladle contains 350 tons of molten steel and steel will flow out of that ladle at the rate of 20 tons a minute, the uncontrollability of this stream creates havoc. The molds are filled very quickly and the ladle is moved from one mold to another, to another, to another with this tremendous amount of spashing taking place. As much steel as possible is tried to be recovered in such a case, but there is a great deal of steel lost. The safety of the men [67] are imperilled and equipment is destroyed, and a king-sized clean up job is required when this is all over.

Q. What is the financial loss incident to such an occurrence, if you know? A. The financial loss of such an occurrence will range between \$5,000.00 and \$10,000.00.

The Court: A year, a month, a week, a day, or what?

The Witness: Per occurrence.

The Court: What?

The Witness: For each occurrence.

The Court: I see.

By Mr. Hoopes:

Q. Now for each occurrence you mean each stopper head failure, is that correct? A. For each stopper rod failure that results in a full running stopper as I have explained, the financial loss will range between \$5,000.00 and \$10,000.00 for that occurrence.

Q. Now please explain to the Court how the Murton Stopper involved in this case differs from prior ladle stoppers, and particularly the ladle stoppers of Bacon,

Sears and the British Patents? A. Murton differs from the references cited, and he differs in an important and very critical manner. Murton's stopper head has a separate insert. This insert is applied or [68] inserted into the stopper head overlying the rod flange and is connected to the head. When the rod is raised the head is raised. The weight of the sleeves cannot be carried by the head. The weight of the sleeves is carried by the insert, and the thrust of the sleeves is transmitted through the insert to the rod flange. It frees the head of any such stress and there is less danger of head failure.

* * * * *

[69] Q. What has been your experience with Murton Stoppers in comparison with other ladle stoppers which you have used. A. The experience with the Murton Stoppers has resulted in a decrease in the head failures. The experience with respect to failures with the other stoppers amounted to about 10 percent. Failures with the Murton Stopper Head have been less than 3 percent.

Q. Two forms are shown in the Murton application. The first form is in figures 1 to 5 and the second in figure 6. Do both forms accomplish the same result insofar as increasing stopper head life is concerned? A. Yes, both forms accomplish the same result.

Q. Please describe for the Court the form of figures 1 to 5? A. In figures 1 to 5 the stopper head 2 has a well 4 which receives the rod 15.

The Court: Are they the same figures, 1 and 5?

Mr. Hoopes: Figures 1 to 5. These figures all disclose the same form. Figure 1 is on plaintiffs' exhibit 3. It shows the head cut away and without the insert in it.

[70] *The Witness:* It receives the rod 15 with the flange 17. The lugs on the insert 9, the lugs insert 9 is disposed

about the rod 15 and is inserted into the well and connects to the head by virtue of the lugs 10.

The insert 9 is inserted into the well. The lugs pass through the vertical channel 6. The insert is rotated 90 degrees to position the lugs 10 under the shoulders 12 of the head.

The insert is thus connected to the head insuring the raising of the head with the rod. The insert is the sole means overlying the lateral projection of the rod flange, thereby the insert relieves the head of stresses of sleeves that are placed above it.

By Mr. Hoopes:

Q. Do you have a stopper head made in accordance with figures 1 to 5 of the Murton Application? A. Yes, I have.

Mr. Hoopes: May the witness step down and demonstrate the assembly of the stopper head?

The Court: He may.

By Mr. Hoopes:

Q. Please demonstrate to the Court the assembly of the stopper head of the form of figures 1 to 5. A. This is the bottom portion of the steel rod marked [71] exhibit number 16. The insert is placed along the rod and is disposed about the rod being positioned down to the lug, to the flange. This is inserted downwardly into the well and rotated approximately 90 degrees and the keepers are placed into the channels securing the rod to the head.

Q. All right. Now will you resume your seat, please?

Will you now describe the form of figure 6 of the Murton Application? A. In figure 6 the head 2-A con-

tains a well which is threaded to engage the insert 9-A. It is disposed about the rod 15-A and is positioned over the flange 17-A. The insert 9-A is screwed into the well. The threaded portion of 10-A of the insert engaging the threaded portion of 6-A of the well thereby connecting the rod to the head.

The under surface of the thread of the head constitutes a shoulder which overlies the thread of the insert to hold the insert down against the rod flange and fastens the rod to the head.

Sleeves 18, which protect the rod and is spaced from the head rests on the insert 9-A.

Q. Do you have a stopper head made in accordance with figure 6 of the Murton Application? A. Yes, I do.

Q. Will you demonstrate the assembly of that to the Court? [72] A. The rod used in both cases is the same rod. The insert is disposed around the rod and is positioned down next to the flange. It is inserted into the head, screwed into the head and connects the rod to the head (demonstrating).

Mr. Hoopes: All right.

The Court: The claim for that has been allowed, you say?

Mr. Hoopes: Yes, Your Honor, to that form. Claim 8 specific to the screw threaded connection has been allowed.

By Mr. Hoopes:

Q. Now please refer to the Murton specification and read from page 1, line 24, to page 2, line 11. That is in plaintiffs' exhibit number 1. A. "I provide a stopper for a ladle or similar receptacle comprising a refractory

head having a well extending downwardly thereinto, a rod having a lateral projection at its bottom insertable downwardly into the well and means applicable to the head and rod into position to overlies at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well whereby to attach the rod to the head, said means being the sole means overlying the lateral projection at the bottom of the rod. Such means are preferably also insertable downwardly into the well above the lateral projection at the bottom of [73] the rod into position to overlies at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well and connected with the head whereby to attach the rod to the head."

Q. In the passage from the specification that you just read, the words "applicable" and "insertable" are used. Where those same words in the claims as originally filed in the Murton Application? A. Yes, they were.

Q. Were those words changed by amendment in the Murton Application? A. Yes, they were changed.

Q. What changes were made? A. The word "insertable" was changed to read "inserted" and the word "applicable" was changed to read "applied".

Q. Why was that done? A. This change was made at the suggestion of the Examiner, who stated that the claims needed more positive language and suggested thereby that this change be made.

Q. And were the exact words suggested by the Examiner incorporated in Murton's claims? A. Yes, they were.

Q. What do the words "connected with the head whereby to attach the rod to the head" in the context of the Murton [74] Application connote to you as a person skilled in the art? A. This means to me any connection which will insure the raising of the head when the rod is raised.

This can be done in a number of ways. As demonstrated, it can be done by use of lugs that are rotated, it can be done by the use of a screw type insert, it can be done in a manner as shown by exhibit 12, and it can be possibly done by some other method, such as a frictional method for attachment.

Q. I wish now to turn to the claims of the Murton Application. Claim 8, which is specific to the threaded structure 6 has been allowed. That claim is set forth in paragraph 5 of the complaint.

* * * * *

Now I will ask you to read claim 2 of the Murton Application on figures 1 to 5 of the drawings, inserting as you read the reference numerals of those figures to designate the elements of the claim. A. "A stopper for a ladle or similar receptacle comprising a refractory head 2 having a well 4 extending downwardly thereinto, a rod 15 having a lateral projection 17 at its bottom inserted downwardly into the well 4 and means 9 separate [75] from the head 2 also inserted downwardly into the well 4 above the lateral projection 17 at the bottom of the rod 15 into position to overlie at least a portion of the lateral projection 17 at the bottom of the rod 15 and thereby block the withdrawal of the rod 15 from the well 4 and connected with the head 2." This is done by the lugs 10 underlying the shoulders 12. "Whereby to attach the rod 15 to the head 2, said means 9 being the sole

means overlying the lateral projection 17 at the bottom of the rod 15."

* * * * *

[76] Q. What, if anything, characterizes claim 2 that is not found in the references? A. The insert is new.

The Court: What?

The Witness: The insert is new.

The Court: All right.

The Witness: Inserted downwardly into the well above the lateral projection at the bottom of the rod into position to overlie at least a portion of the lateral projection and connected to the head by lugs 10 interlocked with the shoulders 12 provides free access from above.

This describes an insert which connects the rod to the head insuring the head is raised when the rod is raised.

[77] The fact that it is also free, has free access from above also insures the fact that the thrust of the sleeves downwardly is transmitted through the insert to the rod flange.

By Mr. Hoopes:

Q. Does claim 2, the claim you have been referring to, also read on figure 6? A. Yes, claim 2 reads on figure 6.

Q. Now I wish you would read claim 2 on figure 6 inserting the reference numerals of figure 6 as you read.
A. "A stopper for a ladle or similar receptacle comprising a refractory head 2-A having a well 4-A extending downwardly thereinto, a rod 15-A having a lateral projection 17-A at its bottom inserted downwardly into the well 4-A and means 9-A separate from the head 2-A also

inserted downwardly into the well 4-A above the lateral projection 17-A at the bottom of the rod 15-A into position to overlie at least a portion of the lateral projection 17-A at the bottom of the rod 15-A and thereby block withdrawal of the rod 15-A from the well 4-A and connect it with the head 2-A."

In this case this is done by the screw threads 10-A and 6-A.

"Whereby to attcch the rod 15-A to the head 2-A, said means 9-A being the sole means overlying the lateral [78] projection 17-A at the bottom of the rod 15-A."

Q. You have stressed the fact that the Murton insert in either form serves to support the sleeves and transfer their thrust to the rod flange freeing the stopper head from the thrust of the sleeves.

Is this disclosed in the Murton Application? A. Yes, the sleeve shown in figure 6 is 18. It is shown resting directly on the insert 9-A. The insert 9-A projects upward and receives the thrust of the sleeve.

Q. No sleeve is shown in figure 5. Is the teaching of that figure different than the teaching of figure 6?

A. No, the teaching in that figure is the same. In this particular case the insert is noted to be flush with the top of the head. However, a sleeve suitable for this application is a matter of design.

In this particular case a sleeve with a downward angular projection would dispose about the rod and rest on the insert.

Q. Murton's claims do not mention the sleeves. As a person skilled in the art, does this affect your understanding of the Murton invention? A. No, it doesn't.

The ability of the insert to support the sleeves thereby transmitting the thrust through the rod flange is an [79] advantage of the Murton invention.

Murton claims a structure which produces this advantage, enabling the insert to support the sleeves and thereby transfer the thrust to the rod flange.

Q. Before considering the application of the references to the claims by the Patent Office tribunals, please explain to the Court what the references teach? Take the Sears Patent first. A. The Sears Patent discloses a stopper for a discharge orifice 12 of a glass smelting furnace. The stopper head 20, also called a needle, has a central longitudinal opening 28 in figure 3. Below this opening is a chamber 27. Plate 29 is contained in this chamber. Rod 33 has a member 34 at its bottom.

The plate is inserted into the stopper head when the head is being molded and the clay is green. It cannot be inserted or removed after the head is fired.

When the rod 33 is lowered the member 34 passes through the slot 30 and the rod is turned and the member 34 sits in the recess 31.

The sleeves 21 sit directly on the head. And nut 35 is tightened down on the sleeve at the top of the rod.

Q. Now please explain to the Court what the Bacon Patent discloses. [80] A. The Bacon Patent discloses a bayonet-joint stopper 5 that is provided with a hole 6, with vertical slots 8 and grooves 7 that extend circumferentially through an angle of 90 degrees from the bottom of the slot.

Channel inserts 9 are fitted into the grooves 7 before the rod is inserted.

Rod 1 has a thin tube passing through it near its bottom.

When the rod is inserted and pin 2 reaches the bottom of slots 8 the rod is rotated to the dotted position shown in figure 2.

The sleeves 4 surround the rod and bear directly on the head, as in the case of Sears.

And the nut 10 is tightened to hold the sleeves in line at the top of the rod.

Q. Can the channel inserts 9 of Bacon be inserted downwardly into the hole 6 above the projecting ends of the pin 2? A. No, they cannot.

Q. Please explain to the Court what the British Patent discloses. A. In the British Patent the well is shaped so that the rod E with the flange F at its lower end is introduced into the well and shifted laterally so that part of the flange F [81] underlies a portion of the head at the right, as shown in figure 5.

The locking block or keeper B-2 is inserted into position as shown in figure 5. The sole function of the keeper is to prevent lateral movement of rod E to the left, as shown in figure 5, which would permit it to separate from the head D by upward movement out of the well.

The keeper B-2 is not connected or applied to the head thereby to attach the rod to the head. The only thing that keeps the rod from separating from the head is that portion of the head overlying the flange at the right.

Q. The defendant's answer denies patentability of the claims in suit in view of the final rejection of April 15th, 1960, plaintiffs' exhibit 1, page 37. There the Examiner's position is stated as follows:

"The Examiner takes issue with applicant's assertion that the locking block B-2 has no holding down func-

tion whatever in the British patent, for it is apparent that as stopper sleeves are positioned over the stopper end then in fact the stopper rod will be locked in place with the aid of block B-2."

Is the Examiner's position correct? A. No, his position is not correct.

Q. Can you demonstrate that for the Court? A. Yes, I can.

[82] Q. Please do so. And please explain what it is that you are using. A. This is a wooden replica of the British Patent. This is the stopper head. It is composed of wood, and that portion of the head that overlies the flange F is made of plaster of paris to make this demonstration.

This is the keeper that is inserted into the well.

Q. Did you give the exhibit number of the head? A. The exhibit number is 23. And the sleeves used are exhibit number 24.

Q. Now explain what you are doing as you go along, please. A. I am dismantling what would be the stopper rod. This is the nut at the top that holds the sleeves in line. These are the sleeves that dispose about the rod. The rod is inserted down into the well which is eccentrically made and is shifted to the left.

Q. Is that exactly in accordance with the disclosure in the British Patent? A. Yes, it is.

The keeper B-2 is then placed downwardly into the well. The sleeves are positioned above the rod. The nut is applied to the top. When solidified metal in the well tends to [83] stick to the head the movement of the stopper rod assembly in this fashion will cause this to fail.

Q. Now I will hold down the head giving the effect of the head being held in the bottom of the ladle by the

metal. A. Whenever that portion of the head fails, located to the right, as noted on the exhibit, the keeper B-2 will not connect the rod to the head.

Mr. Hoopes: Your Honor will have noticed that in the demonstration the keeper came right out with the rod and sleeves.

The Court: I noticed that.

Mr. Hoopes: It had no holding down function.

By Mr. Hoopes:

Q. The Examiner's action of April 15, 1960, plaintiffs' exhibit 1, page 37, in utilizing the British Patent as a reference, contends that sleeves will be loaded atop the stopper head of the British Patent and relies on Bacon for a disclosure of sleeves.

The Examiner states:

"The reference of Bacon shows how the sleeves 4 are loaded upon the stopper end portion 5."

Is the examiner correct in drawing on Bacon for a disclosure of sleeves to be stacked atop the head of the British Patent? [84] A. Yes, the Examiner is correct.

Although there are no sleeves shown in the patent, it is apparent to one skilled in the art that sleeves are required and are necessary to protect the rod from the heat of the molten metal. Thus, the sleeves that are used bear directly on the head.

Q. The Examiner's rejection of April 15, 1960, further states:

"The claims merely recite a 'means separate from the head' and positioned 'to overlies at least a portion of the lateral projection at the bottom of the rod' which is true of the references of record."

Is that statement correct? A. No. Murton's claim states that the insert is inserted or applied downwardly into the well to overlie a portion of the lateral projection at the bottom of the rod. This expression characterizes Murton's structure.

It connotes an insert constructed to be inserted downwardly into the well above the rod flange. This is true in the case of inserts 9 and 9-A, but it is not true in the references of Sears and Bacon.

Q. The defendant's answer also relies on the Examiner's action of October 26, 1960, plaintiffs' exhibit 1, page 57.

In that action the Examiner held that the applicant [85] had not demonstrated that his device produces "new and useful results never before attained".

Does the Murton ladle stopper as claimed in the application at bar produce "new and useful results never before attained"? A. Yes, it does.

Murton's insert has no equivalent in the references cited, and it makes possible the relieving of the stress imposed by the sleeves. It makes possible the use of an insert which transmits this thrust downwardly to a flange on the rod, thereby freeing the head of any thrust and thereby greatly improving the chances of not having head failure.

Q. The defendant's answer also relies on the Examiner's answer of June 23, 1961, plaintiffs' exhibit 1, pages 88 to 92.

The basis for the rejection on Bacon in the Examiner's answer is the holding — page 89 — that Bacon's channel inserts 9 are "adapted" — the word "adapted" is underlined by the Examiner — "to be inserted downwardly into the well and above the said lateral projec-

tion" — the pin 2 — "on the rod to thus prevent withdrawal of the rod and thereby to attach said rod to said head."

The Examiner concludes his argument with this statement, page 89:

[86] "As the instant claims are drawn to the structure of the stopper assembly it is the Examiner's position that the method of assembly of the individual elements lends no patentable merit to the specific structure."

Do Murton's claims depend on the method of assembly? A. No, they do not depend on the method of assembly.

Nowhere in Murton's claims is the word "adapted" used. The insert is either applied or connected.

As stated before, the words "insertable" or "applicable" were originally used, but the suggestion of the Examiner caused a change. These words connote a structure which provides for the obtaining of the advantage of Murton's invention, which includes an insert applied downwardly into the well above the rod flange and connected with the head; and the insert receives the thrust of the sleeves and transmits that thrust to the rod flange.

Q. Considering claim 2 as an example claim, the claim specifies:

"Means separate from the head also inserted downwardly into the well above the lateral projection at the bottom of the rod."

What does this mean to you as a person skilled in the art? A. This defines a structure which accepts a flange [87] rod and an insert on that rod, thereby connecting the rod to the head.

Q. Is the stopper head of Bacon so shaped? A. No the stopper on Bacon is not shaped in that manner.

The insert channels cannot be inserted into the grooves before the rod is inserted in the well of the head.

Q. What did the Examiner say about the limitation in claim 2, "said means being the sole means overlying the lateral projection at the bottom of the rod"?

A. This was not mentioned by the Examiner in any way.

Q. The Examiner's position with respect to Sears was analogous to his position on Bacon. The Examiner said, plaintiffs' exhibit 1, pages 89 to 90:

"It is the Examiner's position as in the case of the Bacon device that the means 29 may be inserted into the well after the head is molded."

Is that position sound? A. This position is not sound. Sears' drawings of the Patent show that the plate 29 cannot be inserted after the head is molded.

In fact, Sears himself, in line 86, page 2, states the plate is placed in green clay when the head is molded.

Q. I wish to refer next to the decision of the Board of Appeals, plaintiffs' exhibit 1, pages 131 to 134. Let me [88] ask you first whether you find any difference between the Examiner's reasoning and the Board's reasoning in rejecting the claims here in issue? A. Yes, the Examiner had been dependent on plate 29 and channel inserts 9—

Q. That is the plate 29 of Sears? A. Of Sears.

Q. And— A. And the channel inserts 9—

Q. Of Bacon? A. Of Bacon, as the means inserted downwardly into the well above the lateral projection at the bottom of the rod.

The Board, however, realizes that this cannot be done. The Board, therefore, eliminates plate 29 in its treatment of Sears and also the inserts in Bacon.

Q. Please now refer to the Board's rejection of Murton's claims on the Sears Patent. A. On the Sears Patent the plate 29 is eliminated. The rod 33 carries a member at its bottom 34. The Board seized on the word "carries" and then proceeded to modify that structure by splitting the member 34 into two parts, the upper part being countersunk to receive the lower portion.

In that manner they attempted to read on Murton's claims. This is not taught in Sears and the splitting of that member 34 absolutely has no utility except to read on Murton's [89] claims.

Q. Do you have models showing the Sears structure as disclosed in the patent and the reconstruction proposed by the Board? A. Yes.

Q. Will you demonstrate those models to the Court? A. This is plaintiffs' exhibit 20. It is a wooden replica of the Sears head.

As Sears has stated, plate 29 is loosely fitted in the head.

This chamber created while the head is being formed of green clay contains plate 29, which is the plate relied on by the Examiner.

This is the rod, plaintiffs' exhibit 21, which shows the rod 33 with the member 34 at its bottom. This is inserted downwardly and must fit in through the slot 28 and also through the slot in plate 29.

As Sears stated, this plate is loosely fitted, and as such provides difficulty, which I have here now.

The rod is inserted downwardly and then rotates and fits in the recess underneath plate 29.

The Board, however, changed this. They removed the plate and now substituted in its place the partitioning of this member 34 with a countersink at the bottom,

preferably a [90] non-circular countersink. If it were circular it would tend to be dis-aligned. However, since it is countersunk it retains some position, but on insertion, of course, it moves and this modification is lowered and then rotated into position to underlie the uppermost surface of the chamber 27, I believe.

Q. While you are still there, is there any advantage in that partitioning of the member 34, as you called it?

A. No, there is no advantage. In fact, there is a distinct disadvantage. The Sears Patent tells me that this carrying member at the bottom is an integral part of the rod and not made into two pieces as the Board has done.

Q. Do you find any teaching in the prior art that the member 34 should be divided into two members, as the Board proposed? A. No.

Q. Do you have any indication from the record what caused the Board to make that suggestion? A. In my opinion, the Board has reconstructed this carrying member 34 at the bottom to read on Murton.

Q. To provide an insert as called for in Murton's claims; is that what you mean? A. Yes.

Q. All right. Now will you resume your seat, please?

What does the clause defining the "means separate [91] from the head" in claim 2 mean to you as a person who is skilled in the art? A. First, the claim 2 states a rod having at its lateral projection, having a lateral projection at its bottom, inserted downwardly into the well. This describes the rod and the flange.

Then, and means separate from head also inserted downwardly into the well above the lateral projection of the rod, describes an insert. This means something in addition to the rod other than another carrying member

on the rod, as has been proposed by the Board in modifying Sears.

Q. The Board states also on page 133 of the application file:

"The locking pin 2 of Bacon could be secured to the rod 1 in a manner similar to Sears."

What teaching do you find in Bacon as to how the pin 2 is secured to the rod 1 of Bacon? A. The only disclosure that Bacon makes is that pin 2 passes through rod 1 near the bottom of the rod.

Q. Is there in Bacon any "means separate from the head" as specified in claim 2 of Murton, as already discussed by you in your testimony? A. No, there are no such means.

Q. The Board further states "in addition this inter-[92]relationship of locking means and rod is so broadly set forth that claim 2 would read on Bacon if the rod thereof were of slightly larger diameter immediately below the pin 2". Do you find in Bacon any teaching that the rod 1 should be of slightly larger diameter below the pin 2? A. No, there is no teaching in Bacon that would lead me to believe that the rod should be slightly larger below the pin.

This would prevent the rod from being inserted into the well.

Q. Because then the diameter of the rod would be greater than the diameter of the well; is that right? A. That is right. And there is no particular advantage for doing this.

Q. The Board states at page 132 of the application file, plaintiffs' exhibit number 1:

"In appellant's device such stresses as may exist between the locking flanges of the plug 9 and the head 3 are distributed only on the interengaging area, which.

as far as the claims are concerned may be even a smaller area than presented by the interlocking members 34 of Sears or 2 of Bacon."

What is the importance of the area referred to?

A. The importance of the area is the bearing surface [93] between the shoulder and the insert that provides for the movement of the head upward when the rod is moved upward.

The amount of bearing surface there is purely a matter of design. This could be done by those skilled in the art to provide the necessary bearing surface to accomplish this fact.

In the case of Murton the bearing surface necessary would not be as great, inasmuch as the insert provides the thrust of the sleeves to the rod flange, therefore, the upward force to the upward area would be less. This is purely a matter of design on application.

Q. And something which would be determined by any person skilled in the art? A. That is correct.

Q. So far as concerns the interengaging area between the head and the means of connecting the rod and head together, what would be the effect of following the Board's suggestion of making Bacon's rod "of slightly larger diameter immediately below the pin 2"? A. This would have the net effect of making the bearing surface smaller for the pin. Since the rod has been enlarged below the pin, it cuts down necessarily on the amount of shoulder that is then provided for the pin 2 to bear against.

Q. Is this consistent with the Board's criticism of [94] Murton's claims? A. No, this is not consistent. The Board had criticized Murton for his limitations in specifying the area of the shoulder.

Q. Do you mean, in not specifying? A. Did not specify.

Yet they proceeded to cut down on the bearing surface in their modification of Bacon.

Q. Now referring to claim 5, that claim calls for a downwardly facing shoulder in the head and "means separate from the head inserted downwardly into the well upon insertion of the rod interposed between said shoulder and the lateral projection at the bottom of the rod blocking withdrawal of the rod from the well whereby to attach the rod to the head".

Is this structure in either Sears or Bacon? A. No, this structure is not in the references.

Murton distinguishes over the references Sears and Bacon and these changes are made by the Board with respect to the rod in Bacon and by the splitting of member 34 in Sears.

Q. Claim 7 calls for "cooperating preformed elements fitting together to at least largely surround the rod above the lateral projection thereon applied to the head into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the [95] rod from the well whereby to attach the rod to the head".

The Examiner, plaintiffs' exhibit 1, page 92, construed Bacon's "solid portions between the grooves 8" as the "cooperating preformed elements fitted together to at least largely surround the rod".

Do you find any teaching in Bacon supporting such a construction? A. No. The solid portion of the head between the chambers or the slits 8, to me, is an integral part of the head itself, and it is not analogous to the split means of Murton's claim.

Q. Would there be any way of fitting these solid portions together? A. No, they are part of the head.

Q. They are both parts of the same integral structure? A. Yes.

Q. The Board departed entirely from the Examiner's reasoning, holding — plaintiffs' exhibit 1, page 133 — "The use of split bushings to facilitate assembly to a rod is a common mechanical expedient. The use thereof in the present surroundings for its usual purpose would be well within the expected skill of the art."

What is a bushing? A. A bushing is a bearing or a lining for a bearing [96] of the rotating element.

Q. A bearing for a rotating element? A. Yes.

Q. Is any such function herein involved? A. No, there is nothing involved in this particular case.

Q. Does any reference, Bacon, Sears or the British Patent, have any split means overlying the rod flange and applied to the head for forming the function of attaching the rod to the head? A. No, there is nothing in the references wherein a split means is used.

Q. In any of the references; is that correct? A. In any of them cited.

Q. Explain the function of the "cooperating preformed elements" of claim 7. A. This pertains to the split insert. The insert as shown in the demonstration of the unitary type. However, the insert can be split longitudinally for convenience in assembly, and it can perform the same function as the unitary type.

As noted in the film and stated, the insert is slid along the entire length of the rod, and if by chance during assembly some mistake is made in eliminating or failure to [97] provide for the insert the split insert is a convenience for assembly of the stopper.

Q. How does claim 9 differ in substance from claim 5? A. Claim 9 denotes a turning of the insert.

Claim 9 parallels claim 5 by having a shoulder, but claim 5 also could be covered by the plaintiffs' exhibit 12 which has been presented, wherein detents located at the end of spring fingers could on insertion downward engage in the shoulders in the head and thereby attach the rod to the head.

Q. Without turning? A. Without turning.

Q. What is the difference between claim 12 and the claims that you have discussed? A. Claim 12 covers the refractory parts of the stopper. It covers the head and the inserts which are supplied by the refractory companies. The steel rods are supplied by the users. This claim is for the purpose of the head and the insert and not for the rod.

Q. The record shows that claim 11 was canceled and that through inadvertence when claim 11 was canceled, claim 13, which was drawn in dependent form, based on claim 11 was not rewritten in independent form.

The Examiner rejected the claim on the technical ground that "it is clearly indefinite as being dependent [98] on previously canceled claim 11", plaintiffs' exhibit 1, page 92.

However, the Board considered claim 13 as though written in independent form.

The claim written in independent form appears in amended paragraph 8 of the complaint set forth in the stipulation dated February 8, 1963.

Does your testimony as to earlier claims apply to this claim? A. Yes, it does.

Q. And does claim 13 have something in addition? A. Claim 13 differs from other claims, inasmuch as it

refers to a holding member marked 14 on figure 3, which is a keeper and holds the insert and the head from relative movement.

Q. And how is that keeper applied? A. The keeper is applied through the vertical channels 6 after the rod and insert have been inserted into the head, rotation made, and the keepers are placed in position to lock.

The Court: Those are the two blocks that you demonstrated in this first one?

The Witness: Yes, Your Honor.

The Court: I see.

By Mr. Hoopes:

Q. Would the result be accomplished by one keeper? [99] A. Yes.

Q. The Board said of claim 14, "It differs from claims such as claim 2 by the recitation of means holding said head and said separate means against substantial relative movement. This broad limitation is met by the threaded means of Sears and Bacon, which hold the stopper in assembled relation."

Do you find such a combination in Sears or Bacon?

A. There is no such combination in either Sears or Bacon.

Q. What is the function of the nuts, the nut 35 in Sears and the nut 10—I believe it is—in Bacon? A. The nuts at the top of the steel rod hold down the sleeves which are seated on the head.

It has no function analogous to the keeper in Murton's claim, whereby the keeper holds the head and the insert from relative movement.

In actual use the nuts at the top of the rods are loosened to provide for expansion of the sleeves when they are heated by the molten metal. But the nuts are in no way equivalent to the keeper 14.

The Court: There is no claim 14 before the Court, is there? I thought I heard you mention that in one of your questions.

[100] *Mr. Hoopes:* I am sorry, sir, if I said 14. Claim 13 is the claim we were talking about.

Reference was made to the locking member 14, and 14 was used because that is the reference numeral applied to the locking member.

The Court: No, you said claim 14.

Mr. Hoopes: If that was said, Your Honor, I am sorry. We misspoke if we said that, Your Honor.

The Court: Well, it is corrected now anyhow.

Mr. Hoopes: Very good, sir.

By Mr. Hoopes:

Q. How do you provide for expansion of the refractories of the ladle stopper at Jones & Laughlin? A. At the number 4 shop at Jones & Laughlin the rod, as I stated, is 16 feet long. The expansion is not provided by loosening the nut as is the case here. The expansion is provided by a wooden block which is inserted between the nut and the topmost portion of the top sleeve, and the nut is then tightened down on this wooden block which burns out during the pouring of steel and provides the expansion required for the rod sleeves that are expanding during use.

Q. Doesn't the burning out of the block result in loosening of the nut? A. It provides a gap whereby the sleeves are able to [101] expand upward to the nut.

Q. What position did the Board take as to the pertinence of the British Patent? A. The Board's position was that it had no pertinence.

The Board did not mention the British Patent other than listing it as a reference cited by the Examiner.

Mr. Hoopes: Direct examination closed.

The Court: Cross-examine, Mr. Roeming.

CROSS EXAMINATION

By Mr. Roeming:

Q. Now, sir, you have testified that there was error in the Examiner's position regarding the British Patent, and you tried to demonstrate that error with the breaking of exhibit 23, which I will show you? A. Yes.

Q. And 24.

Now the Examiner specifically said, when additional sleeves as shown by 4 and 21 of Bacon and Sears patent are placed upon the head portion as in the British patent locking block B-2 will be secured against vertical movement when a withdrawal pressure is exerted upon the rod.

Now I ask you this question.

Look at the depth of this well in here (indicating) and then look at the dimension of this protuberance on here. [102] Is it not true that the depth of this protuberance is less than the depth of this well?

The Court: You can try by putting it into it, can't you?

Mr. Roeming: You can't see it but you can feel it with your finger.

The Witness: It appears to be.

Mr. Roeming: Thank you.

The Court: Well, what does that mean?

Mr. Roeming: I have now a sketch.

The Court: All right.

Mr. Roeming: The sketch I have made is this. Could we have that identified as defendant's exhibit 2?

The Court: So mark it.

The Deputy Clerk: Defendant's Exhibit Number 2 marked for identification.

(Defendant's Exhibit No. 2 was marked for identification.)

By Mr. Roeming:

Q. Is it not true then, that in this exhibit 23 and 24 there was a space "A" between the sleeves and the head, as noted on this sketch? A. There may have been.
[103] Q. Well, there must have been—

The Court: Can't you tell by examining it, by visual or digital examination of the two objects?

The Witness: Yes, that is probably right, Your Honor.

The Court: All right.

By Mr. Roeming:

Q. In other words, this exhibit does not correspond to what the Examiner said when he said that the sleeve on here would hold this (indicating) on here and thus help to hold it in position? A. The part—

Q. My question is, the Examiner said when the sleeve bears on this, in effect, this will keep this in position, but your exhibit does not correspond to what the

Examiner said because of that space. Is that not true?

A. It may be true in this particular case.

Q. Well, as an expert in the art, is it not true?

If this dimension is greater than the protuberance on here, must there not necessarily be a space here as shown in this sketch? A. Yes.

Mr. Roeming: That is all.

I would like to have that received in evidence.

[104] *The Court:* Have you any objection?

Mr. Roeming: And I will furnish copies to the plaintiff.

The Court: Very well, it may be received.

The Deputy Clerk: Defendant's Exhibit Number 2 received in evidence.

(Defendant's Exhibit No. 2 was received in evidence.)

By Mr. Roeming:

Q. Now, as to claim 2, you indicated that the Examiner in his statement at page 2 of his Answer is in error; and that statement is this:

"As the instant claims are drawn to the structure of the stopper assembly, it is the Examiner's position that the method of assembly of the individual elements lends no patentable merit to the specific structure."

You testified that there is no method of assembly in the claims.

Now I ask you this question:

In claim 2 —

The Court: Have you that before you?

The Witness: No, sir, I don't have it.

The Court: Wait until he gets it.

The Witness: Where is the Examiner's answer you are [105] referring to?

Mr. Roeming: I will get you my copy.

By Mr. Roeming:

Q. You testified as to this portion of page 2 of the Examiner's answer. A. The first —

Q. That is it, the mid page, page 2. A. Yes.

Q. And you specifically testified that in the claims there is no method of assembly specified.

Now I ask you as to claim 2 which I have here before you, do you say that the limitation "inserted downwardly into the well" is not a method limitation?

The Court: Read that again.

Mr. Roeming: "Inserted downwardly into the well."

The Witness: I think that is just a small part of the claim. I think additional —

The Court: It shows how it is positioned.

The Witness: This is inserted down into the well, as has been demonstrated.

By Mr. Roeming:

Q. The question is, is it or is it not a method limitation? You have testified that there is no method limitation in these claims. A. I think it is a matter of recognizing structure.

[106] Q. No further questions on that. You have testified that the nuts in the patent to Bacon and in the patent to Sears, particularly the Patent to Bacon that I am re-

ferring to, that this nut up here has no function analogous to Murton's keeper.

Now I ask you this question:

As to the species of Murton's figure 5—The species of figures 4 and 5, 10 being the keeper.

Do you ever use the structure of Murton's figures 1 to 5 without the keeper? A. No, the keeper is used to hold the insert and the head from relative movement.

Q. Now, on another point as long as we have both figures 4 and 5, this species and this species here (indicating). You did testify to the amount of use, if I am not mistaken, to the amount of commercial use? A. Yes.

Q. Was that to your company only or to general use in the United States? A. I testified as to what I was familiar with, what I had been familiar with directly.

Q. Directly? A. This is Jones & Laughlin's plant.

Q. You didn't go beyond that? [107] A. No, I didn't.

Q. I just wanted to be sure about it.

Now I have this question, and I think this is probably in clarification of the plaintiffs' case, but I want it absolutely clear on the record what we are talking about.

When you speak of the fact that when the sleeves bear on this insert and thus the thrust of the sleeves is carried directly to the flange, and you say there is no thrust on the head, do you mean that there is no thrust on this portion of the head? And I am indicating the wall portion of the head of figure 5. Or do you mean that there is no thrust carried down into the bottom of the head when the ladle stopper is pushed downwardly to close the opening? A. I say the head is free of thrust on the first position that you have shown.

Q. That is in the walls? A. Yes.

Q. Now, when you are bringing the ladle down, in other words, you carry your stresses from the sleeves through the members 10 to flange 17 and then down to the thick portion of the head? A. Yes.

Q. And the thick portion of the head is adequate to carry the thrust? [108] A. It is the strongest part of the head.

Q. Yes. The references have always been made to the head as a whole. Therefore, you concede that the thrust, of course, goes down through the orifice through the thickened portion of the head, and your point, as I take it, is that you want to avoid thrust in the thin wall portions; is that correct? A. That is correct.

Mr. Roeming: That is all I have.

The Court: Have you any redirect?

Mr. Hoopes: I would like to confer with Mr. Roeming just a moment, if Your Honor please.

The Court: You may.

RE-DIRECT EXAMINATION

By Mr. Hoopes:

Q. Please refer to exhibit 2, defendant's exhibit 2, which is a drawing purportedly showing the demonstration model of the British Patent.

There is a portion of this drawing indicated as space "A" which is a space below the bottom of the flange on the sleeve and above the surface of the head underlying that. If there is a difference between those dimensions, is that a material difference so far as your demonstration is concerned? A. I don't think so. The difference there is quite [109] small and, in my opinion, I doubt that it had any difference on the demonstration.

The Court: Will those two things (indicating) fit together?

Mr. Hoopes: Will you show this to the Judge?

The Court: Well, they do. Can't you tell by moving one against the other whether or not?

Mr. Hoopes: Your Honor, there is a very slight difference between the depth of the sleeve on the bottom of the orange sleeve and the opening in the head that that goes into. Now it is so slight that I hadn't noticed it before. We had that made by a reputable bottle maker. We gave him a copy of the British Patent and told him to duplicate it and we thought he had done so.

The Court: Well, you can measure it with a pencil, as I did —

Mr. Hoopes: Yes.

The Court: —And see the difference.

Mr. Hoopes: That is right, and the difference is infinitesimal.

The Court: That is right, about a hair line on my pencil. I measured both.

By Mr. Hoopes:

Q. Is the difference between those dimensions [110] that we have been speaking of a difference which is correctly represented in the sketch, defendant's exhibit 2? A. The space in the defendant's exhibit, I believe, is out of proportion.

Q. Well, it is very much greater than the difference in the exhibit, is it not? A. Yes.

Mr. Hoopes: That is all.

Mr. Roeming: Have you finished?

Mr. Hoopes: Yes.

RE-CROSS EXAMINATION

By Mr. Roeming:

Q. Is it not true that in the Bacon Patent the conventional sleeves are shown here with each one having this protuberance on it that is illustrated in your own exhibit 19? A. Yes.

Q. They fit together, do they not? A. Yes.

Q. Now, what the Examiner said was that when this sleeve is fitted into the British Patent which, of course also has sleeves, the British Patent specifically referring to those sleeves, his position was that when that insert comes in here you have contact. A. But the British Patent says—

[111] Q. Between B-2 and the insert of this sleeve. Now if there isn't contact, obviously, it makes no difference whether the space be 1/16 of an inch or 1/32 of an inch or 1/4 of an inch, there is then a different pressure on this flange and on this portion here, is it not?

The Court: Please, what is your question? You have given a long dissertation. State a question, please.

Mr. Roeming: I am sorry.

By Mr. Roeming:

Q. Do you take the position that it is immaterial whether there is or is not contact here as to the pressure from this flange onto these members here? A. I take the position that there are no sleeves shown in the British Patent, and what arrangement they would have I am not prepared to say.

* * * * *

[113] Q. Now is it not true that the British Patent specifically mentions sleeves in a portion here? A. Yes, but the dimensions of those sleeves aren't apparent from the drawings.

Q. But as to your own specification, which gives no description, as to figure 5, of the relationship of the sleeves to the insert, you say it is obvious to one skilled in the art, yet as to the British Patent you will not make such a concession? A. I will make a concession that a sleeve fits in the British Patent around the steel rod to protect it from the molten metal, but as to the dimensions of that sleeve or its arrangements, the final detailed arrangements and minute details that you are asking me to read into here, I am [114] not in a position to say.

Q. Now, again getting back to this point, you are not in a position to read anything from the prior art into this figure 5 of the patent to Williams, but you expect to have a similar matter read into the specification of the applicant before the Court? A. Yes.

Mr. Roeming: That is all.

RE-DIRECT EXAMINATION

By Mr. Hoopes:

Q. Well, so far as your construction of figure 5 of the application before the Court is concerned, isn't that related to what you see in figure 6? A. Yes, it is.

The sleeve in figure 6 rests on the insert. In figure 5 the sleeve can also rest on the insert.

In this particular case in 5 the bottom sleeve would have a small downward angular projection that would rest on the insert and transmit the force to the flange.

Q. Now, referring again to the demonstration that you made—

The Court: It is time now for the afternoon recess.

Court will now stand recessed until 3:30.

The Deputy Marshal: This Honorable Court now [115] stands recessed until 3:30.

(Whereupon, at 3:15 p. m. the Court recessed and reconvened at 3:30 p. m.)

Mr. Hoopes: Your Honor, when the recess was taken I was examining the witness on redirect examination in connection with the point raised by counsel for the defendant as to the demonstration which the witness conducted.

And the point which was raised, as Your Honor is aware, was that the depth of the flange on the bottom of the sleeve, plaintiffs' exhibit 24, is slightly less than the depth of the hollow in the top of plaintiffs' exhibit 23.

Now during the recess we have prepared out of cardboard two rings which will serve to make the depth of the flange on the bottom of exhibit 24 even greater than the depth of the space in exhibit 23 and, fortunately, we brought along a spare head that hasn't been broken out yet, that is a spare replica, wooden replica of plaintiffs' exhibit 23, which I have marked 23-A.

This is not on our list but we will take care of that.

Now we have these two rings of cardboard, one of which is marked plaintiffs' exhibit 25 and the other plaintiffs' exhibit 25-A.

Now, Mr. Sergy, will you please step down here to the table, with the Court's permission, and using the head, [116] exhibit 23-A, and these pieces of cardboard, exhibits 25 and 25-A, for the purpose I have just explained, repeat the experiment.

The Witness: This head (demonstrating) is made of wood.

The Court: I know that.

What counsel wants you to do, I assume, is to put these things together again; isn't it?

Mr. Hoopes: That is right.

By Mr. Hoopes:

Q. Now, what have you done? A. I have narrowed this gap or the void that was listed on —

The Court: You narrowed the gap by the insertion of those two discs and you have already given the numbers.

The Witness: Yes, sir.

By Mr. Hoopes:

Q. Now, before the experiment is conducted state what the condition is between the bottom flange and the top of the head? A. There is a gap between the head and the sleeve that rests on the head. This is due to the cardboard that has been inserted.

Q. Which had the effect of increasing the length of the — [117] A. Downward angular projection on the bottom of the sleeve.

Q. When we conducted this experiment before in which we are now going to do again, I held down the head while you pulled up on the rod.

Now what is the relationship between my holding down the head in this demonstration and the actual use of the head? A. The purpose of this, Your Honor, is to demonstrate that the metal that solidifies around the nozzle has a grappling effect and holds the head down, and as they raise the rod, which in effect we are doing here, this demonstrates what happens.

Q. One other question I want to ask you before we conduct the demonstration. The heads that we have used for demonstration purposes are made of wood but have

a portion of plaster of paris, that portion of plaster of paris being the portion to be pulled out. What is the reason for using the plaster of paris portion? A. Plaster of paris is to make the demonstration without exerting as much force as we would have to exert if the whole thing was made of wood.

Q. In principle it —

The Court: It reduces friction, does it?

[118] *The Witness:* Yes, sir.

The Court: All right.

By Mr. Hoopes:

Q. Is there any difference in principle between carrying out the demonstration with the plaster of paris than with the head which is made entirely of wood? A. No, there isn't.

Q. Just less force is required? A. Right.

Q. Now I will hold the head down and you pull up on the rod. State what result was obtained. A. The same result was obtained. The locking block B does not attach the head to the rod. And when that portion of the head fails it overlies the flange, the head separates and the keeper 2 does not maintain the head on.

The Court: Why the result is just the same as in your former experiment, isn't it?

The Witness: Yes, sir.

Mr. Roeming: Your Honor, may the record show though that with similar models it took considerably more effort to break it this time?

The Court: I don't know. Maybe the grip wasn't quite as good, and possibly that rounded head is smooth.

The record may show that.

[119] *By Mr. Hoopes:*

Q. What is your explanation of the reason why more force was required on the second demonstration?

A. Well, this spacer here provides a filler in this gap and makes it somewhat more difficult. However —

The Court: Why if it is filled it causes a suction in there, doesn't it?

The Witness: I am sure it does.

The Court: Whereas if you didn't have it there would be a space, an air space.

By Mr. Hoopes:

Q. Does plaster of paris always set to the same hardness? A. I don't know.

Mr. Hoopes: That is all.

Do you have anything further, Mr. Roeming?

Mr. Roeming: No.

* * * * *

Mr. Hoopes: * * * Plaintiffs offer in evidence exhibits 1 to 24, inclusive. * * *

The Court: If there is no objection they may be [120] received in evidence.

Mr. Hoopes: And in addition three exhibits which are not on that list, and which were prepared for the purposes of the last demonstration, exhibit 23-A, which is the wooden model of the head of the British Patent used on the second demonstration, and exhibits 25 and 25-A, which are the two cardboard rings that were used to insert in that model as the witness has explained.

The Court: They may be received.

* * * * *

TESTIMONY OF THEODORE H. HARLEY.

DIRECT EXAMINATION

By Mr. Hoopes:

Q. Please state your name? A. My name is Theodore H. Harley.

Q. What is your age? [121] A. Forty-two.

Q. Where do you reside? A. In Fox Chapel, a suburb of Pittsburgh, Pennsylvania.

Q. What is your occupation? A. I am the President of Vesuvius Crucible Company, one of the plaintiffs in this case.

Q. How long have you held that position? A. Since 1958.

Q. Are you familiar with the Murton ladle stopper, which is the subject of this suit? A. Yes.

Q. Is the Murton ladle stopper sold by Vesuvius Crucible Company under a trademark? A. Yes, under the trademark Rotolok.

Q. When was the production of the Murton ladle stopper commenced? A. In 1958.

Q. How many of the Murton ladle stoppers have been made and sold up to the present time? A. About one and one-half million.

Q. What is the sales value of those ladle stoppers? A. Over five-million dollars.

Q. Can you state approximately how many tons of steel have been teemed by the use of ladles equipped with Murton [122]ladle stoppers? A. Over two-hundred and seventy-five million tons.

Q. Can you state what proportion of the total sale ingot tonnage currently produced in the United States is teemed by the use of ladles equipped with the Murton ladle stopper? A. Between seventy-five and eighty percent.

Q. What steel companies in the United States use the Murton ladle stopper? Before you answer —

Mr. Hoopes: Your Honor, there is a list of twenty names of steel companies which the witness may utter, but I have given a copy of the list to counsel for the defendant and to the reporter, and unless Your Honor wishes the witness to utter those names they can be copied into the record.

The Court: Very well, let them be copied into the record if there is no objection to them.

Mr. Roeming: No objection.

(The Steel Companies in the United States using Murton Stoppers follow:)

1. United States Steel Corporation.
2. Bethlehem Steel Corporation.
3. Republic Steel Corporation.
4. Jones & Laughlin Steel Corporation.
5. Youngstown Sheet & Tube Company.
6. Inland Steel Company.
- [123] 7. Weirton Steel Company.
8. Great Lakes Steel Corporation.
9. Kaiser Steel Corporation.
10. Ford Motor Company.
11. Armco Steel Company.
12. McLouth Steel Corporation.
13. Wheeling Steel Corporation.
14. Granite City Steel Company.
15. Lukens Steel Company.
16. Sharon Steel Company.
17. Phoenix Steel Corporation.
18. Acme Steel Company.
19. Northwestern Steel & Wire Company.
20. Pacific States Steel Company.

By Mr. Hoopes:

Q. Are the Murton ladle stoppers sold to customers in countries other than the United States? A. Yes.

Q. Please name such other countries? A. Australia, Belgium, Brazil, Chile, Canada, France, West Germany, Holland, Italy, Japan, Luxembourg, Mexico, Peru, Singapore, Republic of South Africa, and the United Kingdom.

Q. What foreign steel companies use the Murton ladle stopper?

[124] *Mr. Hoopes:* And again, Your Honor, there is a list of twenty foreign steel companies. I have given copies of the list to counsel for the defendant and to the reporter, and unless Your Honor wishes the witness to utter those names, they can be copied into the record.

The Court: They needn't be uttered. They may be copied into the record.

(Following is the list of Foreign Steel Companies using the Murton ladle stopper:)

Canada

1. Algoma Steel Company, Ltd.
2. Dominion Foundries & Steel, Ltd.
3. Dominion Steel & Coal Co.
4. Steel Company of Canada.
5. Atlas Steel Limited.

Mexico

6. Monterrey Steel Co.
7. Hosalta Y Lamind.
8. Lamindora Kreimerman.
9. La Consolidada.

Brazil

10. Brazilian National Steel Corp.

Chile

11. Companie de Acero del Pacifico, S.A.

[125] Holland

12. Royal Netherlands Steel Co.

West Germany

13. August Thyssen Hutte.

14. Phoenix Rhemrohr.

United Kingdom

15. Colvilles Steel Co., Ltd.

16. Consett Iron Co., Ltd.

17. Samuel Fox Ltd.

18. English Steel Co., Ltd.

Republic of South Africa

19. South African Iron & Steel Co.

Japan

20. Kawasaki Steel Co.

By Mr. Hoopes:

Q. Has the Vesuvius Crucible Company filed in foreign countries patent applications corresponding to the Murton United States Patent Application? A. Yes. Vesuvius Crucible Company has filed the Murton Application for a stopper head in all of the principal steel producing countries in the world except those behind the iron curtain.

Q. Have any of the foreign applications been refused? A. Only one, in Austria. I understand that the [126] application was refused in Austria because it was not filed until after the Murton Patent Specification had been published in the United Kingdom. Under Austrian law, the publication of a corresponding specification in the United Kingdom constitutes a bar in Austria.

The Court: I see. Public use we call it here.

The Witness: Correct, sir.

By Mr. Hoopes:

Q. What about the applications in the other foreign countries? A. Most have issued as patents. There are a few still pending.

The Court: The same claims as you have here?

The Witness: Yes, sir.

The Court: Identical?

The Witness: I will have to retract that. There were additional claims granted in most of these applications that have issued as patents.

By Mr. Hoopes:

Q. Has the Vesuvius Crucible Company been approached by other refractories manufacturers for licenses to make and sell the Murton ladle stopper? A. Yes.

Q. Can you name some of the other refractories [127] manufacturers who have sought licenses?

Mr. Hoopes: And again, Your Honor, this is a list of fourteen refractories manufacturers in the United States and abroad, and copies have been given to the reporter and counsel for the defendant.

The Court: Very well, they may be included without testifying to the names.

(Following is a list of refractories manufacturers who approached Vesuvius Crucible Company with respect to procuring licenses to manufacture and sell the Murton ladle stopper.)

1. The Joseph Dixon Crucible Company of Jersey City, New Jersey.
2. Lava Crucible-Refractories Company of Pittsburgh, Pennsylvania.

3. The Morgan Crucible Company, London, England.
4. Stoecker & Kunz G.M.B.H., Krefeld-Linn, Germany.
5. Martin & Pagenstecher A.G., Koln-Mulheim, Germany.
6. Reinisher-Vulkan, Oberdollendorf, Germany.
7. Gebr. Lungen, Dusseldorf, Germany.
8. Becker & Piscantor, Grossalmerode, Germany.
9. August Gundloch G.M.B.H., Grossalmerode, Germany.
10. Sanac, Genoa, Italy.
11. Manifatturo Ceramica Pozzi S.P.A., Milan, Italy.
- [128] 12. Shinagawa Fire Brick Company, Tokyo, Japan.
13. Japan Crucible Company, Tokyo, Japan.
14. Fours Rousseau-Creusets Morgan S. A., Paris, France.

By Mr. Hoopes:

Q. Has Vesuvius Company granted licenses to any other refractories manufacturers which have sought licenses? A. Yes, to one other, the Lava Crucible-Refractories Company of Pittsburgh, Pennsylvania.

Q. What royalty right is provided for in that license agreement? A. Fifteen percent of the net sales price.

Q. How much royalty has the Vesuvius Crucible Company received from the licensee? A. Over seventy-five thousand dollars.

Q. How is the foreign demand supplied? A. At the present time the foreign demand of this stopper head is supplied from our Pittsburg Plant. However, just recently we purchased a plant in Scotland which is currently being equipped and will go into production in about May of 1964, capable of producing about 600,000 stopper heads a year.

The Court: Where is that plant located in Scotland?

The Witness: Twenty miles South of Glasgow near a [129] town called Kilmarnock.

The Court: I had an idea that is about where it would be. Go ahead.

By Mr. Hoopes:

Q. Can you state what Vesuvius Crucible Company's outlay is for the plant in Scotland? A. A little over \$350,000.00.

Q. The complaint in this case gives Mr. Murton's place of residence as in West Germany. Why is that? A. Mr. Murton, the inventor of this stopper head, is a citizen of the United States. In January of 1962 Vesuvius sent him to West Germany to make his services available to the steel producers on the continent, primarily to common market countries. He is there to demonstrate and help these steel producers—

The Court: Well, he is an American citizen who happens to be temporarily in Germany?

The Witness: Exactly.

The Court: All right.

By Mr. Hoopes:

Q. What can you say as to the cost of the Murton ladle stoppers to steel producers abroad in comparison with the cost of ladle stoppers which they previously used? A. The steel companies in the United Kingdom, Holland, [130] West Germany and France are paying from two to five times more for this Murton stopper head than they customarily paid in the past for their own domestically made stopper heads.

Q. How is it that the Murton ladle stopper can be sold at such an increase in price? A. The price differen-

tial in this Murton stopper head is greatly offset by the savings in production costs.

One failure of a stopper head results in thousands and thousands of dollars in damage; and for a few dollars more these steel companies realize the great savings in the use of this particular invention.

Mr. Hoopes: Direct examination closed.

The Court: Have you any cross-examination of this witness?

Mr. Roeming: Yes. May I say to the Court that before this case came to trial Mr. Hoopes and I had back and forth through Mr. Michael and at one time it was presented to me the copies of the patents, alleged patents, not in English. And of course that is the prime evidence of what has been granted. I would just like to ask this one question. I have no objection to this evidence in any other respect.

CROSS EXAMINATION

By Mr. Roeming:

Q. Have you read the claims of every foreign patent [131] that has been granted? A. No, I have not.

Q. Thank you. In other words, you are not in a position to say that the claims are identical with the claims before the Court?

The Court: He didn't testify to that.

The Witness: I corrected my statement.

Mr. Roeming: I beg your pardon.

Mr. Hoopes: The plaintiffs rest.

The Court: Very well.

* * * * *

PLAINTIFFS' (APPELLANTS') EXHIBITS

Plaintiffs' Exhibit No. 1

Certified copy of the file wrapper and contents of the application in issue, Murton application Serial No. 759,670.

From front cover of file wrapper:

Application of Crawford B. Murton of Churchill, Pa., Serial No. 759,670, filed complete Sept. 8, 1958, STOPPER FOR A LADLE OR SIMILAR RECEPTACLE, division 3, class 22, subclass 85, assigned to Vesuvius Crucible Company, Swissvale, Pa., a corp. of Pennsylvania.

[1] SPECIFICATION

TO ALL WHOM IT MAY CONCERN:

Be it known that I, CRAWFORD B. MURTON, a citizen of the United States, residing at Churchill Borough, Allegheny County, Pennsylvania, have invented new and useful improvements in STOPPER FOR A LADLE OR SIMILAR RECEPTACLE of which the following is a specification.

This invention relates to a stopper for a ladle or similar receptacle and has to do particularly with the manner of attachment of the stopper rod to the stopper head. Many different proposals have been made for fastening stopper rods to stopper heads but each has had disadvantages. It is undesirable to apply the stopper rod through the bottom of the stopper head as then the opening in the bottom of the stopper head must be plugged and the plug is liable to fall out. Various provisions for applying the stopper rod to the top of the stopper head have been suggested but these have for the

most part involved intricate or impractical structures. They have generally involved so-called "one piece" or permanently assembled stopper rod and head combinations requiring breaking the stopper head to disconnect the rod from the head for replacement of one or the other.

I provide a stopper for a ladle or similar receptacle which obviates the disadvantages of the expedients heretofore employed by those skilled in the art for attaching ladle stopper rods to the stopper heads. I provide a stopper for a ladle or similar receptacle comprising a refractory head having a well extending downwardly therein, a rod having a lateral projection at its bottom insertable downwardly into the well and means applicable to the head and rod [2] into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well whereby to attach the rod to the head, said means being the sole means overlying the lateral projection at the bottom of the rod. Such means are preferably also insertable downwardly into the well above the lateral projection at the bottom of the rod into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well and connected with the head whereby to attach the rod to the head.

I further provide a stopper for a ladle or similar receptacle comprising a refractory head having a well extending downwardly therein, a rod having a lateral projection at its bottom insertable downwardly into the well and means at least largely surrounding the rod above the lateral projection thereon applicable to the head into position to overlie at least a portion of the

lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well whereby to attach the rod to the head. I preferably employ preformed refractory means which are applicable to the head and rod into position to overlie at least a portion of the lateral projection at the bottom of the rod and underlie a portion of the head.

The well of my refractory stopper head preferably has a portion of its wall relatively remote from its bottom of smaller transverse dimension than a portion of its wall less remote from its bottom, forming a shoulder facing toward [3] the bottom of the well, and I preferably provide means interposed between said shoulder and the lateral projection at the bottom of the rod blocking withdrawal of the rod from the well whereby to attach the rod to the head. Such means are preferably preformed refractory means. I desirably employ cooperating preformed elements fitting together to at least largely surround the rod above the lateral projection thereon applicable to the head into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well whereby to attach the rod to the head. The well may be internally threaded and preformed externally threaded preferably refractory means may be provided which are adapted to be threaded into the well into position to overlie at least a portion of the lateral projection at the bottom of the rod; or the well may have at a portion of its periphery a shoulder facing toward the bottom of the well and means may be employed which are insertable downwardly into the well into position to overlie at least a portion of the lateral projection at the bottom of the rod and turnable to a position in which a part thereof

underlies the shoulder to block withdrawal of the rod from the well and thereby attach the rod to the head. Desirably means are provided holding the last mentioned means against turning out of the position in which a part thereof underlies the shoulder to block withdrawal of the rod from the well.

Other details, objects and advantages of the invention will become apparent as the following description of certain [4] present preferred embodiments thereof proceeds.

In the accompanying drawings I have shown certain present preferred embodiments of the invention in which

Figure 1 is an isometric view of a ladle stopper head with a portion cut away;

Figure 2 is an isometric view of a lugged insert ring;

Figure 3 is an isometric view of a locking member;

Figure 4 is a horizontal cross-sectional view of an assembled stopper head and stopper rod utilizing the structures shown in Figures 1, 2 and 3, the cross-section being taken through the stopper rod just above the head and looking downwardly toward the head, the lugged insert ring being shown in full lines in the position in which it is initially inserted into the well in the stopper head and in dotted lines in its holding position turned through an angle of 90° from the initial position;

Figure 5 is a vertical cross-sectional view through the assembled stopper head and stopper rod utilizing the structures shown in Figures 1, 2, 3 and 4 but with the lugged insert ring in its holding position; and

Figure 6 is a vertical cross-sectional view through a modified form of structure.

Referring now more particularly to the drawings and especially to Figures 1-5, there is shown a refractory head 2 of a stopper for a ladle or similar receptacle. The bottom portion 3 of the stopper head 2 is solid and imperforate. The stopper head has a well designated generally by reference numeral 4 extending downwardly thereinto from the top surface [5] 5 thereof. The well 4 is of generally circular shape but having opposed outwardly projecting portions 6 each of which is connected adjacent the bottom 7 of the well 4 with a circumferentially extending cut out portion 8.

Figure 2 shows a lugged insert ring the body of which is designated generally by reference numeral 9 and which has projecting outwardly therefrom at the lower portion thereof opposed lugs 10. The lugged insert ring is adapted to surround the stopper rod as will presently be described and to pass downwardly within the well 4 with the lugs 10 moving within the outwardly projecting portions 6 of the well. When the lugged insert ring reaches the position in which the lugs 10 are in lateral alignment with the circumferentially extending cut out portions 8 of the head 2 the lugged insert ring is turned about its axis through an angle of 90° to position the respective lugs underneath portions 11 of the stopper head, which portions overlie the cut out portions 8. As will be understood from the above description, the well 4 has a portion of its wall defined by the inner surface of the portion 11 of the stopper head relatively remote from its bottom 7 of smaller transverse dimension than a portion 8 of its wall less remote from its bottom 7 forming a shoulder 12 facing toward the bottom of the well. Actually there are two such shoulders at diametrically opposed portions of the stopper head. They coact with the

upper surfaces 13 of the lugs 10 to hold the lugged insert ring against movement out of the well 4. When the lugged insert ring has been turned to the position in which the lugs 10 are underneath the shoulders [6] 12 a locking member 14 shown in Figure 3 is dropped into one of the outwardly projecting portions 6 of the well to prevent turning of the lugged insert ring back to its initial position since the locking member 14 lies in the path of one of the lugs 10. While one locking member 14 is all that is required two such locking members are preferably used for added locking safety.

Figure 5 shows a stopper rod 15 assembled with a head 2 and a lugged insert ring as shown in Figure 2. The stopper rod 15 extends through a bore 16 in the lugged insert ring as shown in Figure 5, and the stopper rod has a lateral projection 17 at its bottom. As shown the lateral projection 17 is circular and coaxial with the rod 15. Its diameter is less than the diameter of the well 4 intermediate the portions 6 so that the stopper rod may be insertable downwardly into the well.

Before the stopper rod 15 is inserted downwardly into the well of the stopper head the lugged insert ring is applied over the stopper rod so as to rest upon the upper surface of the lateral projection 17. The lower portion of the stopper rod with the lugged insert ring thereabout and resting upon the lateral projection 17 is inserted downwardly into the well 4, the lugs 10 of the lugged insert ring moving downwardly through the portions 6 of the well. When the bottom of the rod seats upon the bottom of the well the upper surfaces 13 of the lugs 10 will be slightly below the level of the shoulders 12. Thereupon the lugged insert ring will be turned through an angle of 90°, more or less, and the locking

members 14 [7] inserted as above described to maintain the assembly. The lugged insert ring cannot be removed from the well of the stopper head because the lugs 10 underlie the shoulders 12. The stopper rod is held in place by the lugged insert ring acting upon the upper surface of the lateral projection 17.

Figure 6 shows a modified construction including a refractory stopper head 2a the bottom portion 3a of which is solid and imperforate. The stopper head has a well designated generally by reference numeral 4a extending downwardly thereinto from the top surface 5a thereof. The well 4a is of generally circular shape and internally threaded as shown at 6a. The bottom of the well is designated 7a and is of somewhat smaller diameter than the threaded portion thereof. The stopper rod is designated 15a and has at its bottom a lateral projection 17a. Surrounding the lower portion of the stopper rod 15a above the lateral projection 17a is a preformed refractory collar 9a which is externally threaded as shown at 10a so that the collar may be screwed down into the well 4a with the threads 10a of the collar meshing with the threads 6a of the well as shown in Figure 6. The collar 9a may be a solid completely circular collar or it may consist of cooperating preformed elements fitting together to at least largely surround the rod. For example, the collar 9a may be made in two halves which may be applied to the rod from opposite sides so that when applied the effect is the same as a solid collar and the sectional collar may be screwed down into the well of the stopper head just the same as a solid collar. Each of the threads 6a of the well 4a constitutes a portion of the wall of the well relatively remote from its bottom of smaller transverse dimension than the space underlying

it which is less remote from the bottom [8] of the well so that the lower portion of each thread forms a shoulder facing toward the bottom of the well. Those shoulders act to maintain the collar 9a in place and the collar in turn acts against the upper surface of the lateral projection 17a to block withdrawal of the rod 15a from the well and thereby attach the rod to the head. A rod protecting sleeve is shown at 18; the sleeve may be of conventional form.

The lugged insert ring 9 and the collar 9a are preformed of refractory material which may be the same as the refractory material of the stopper head so as to have the same coefficient of thermal expansion. In both the form of Figures 1-5 and the form of Figure 6 the preformed refractory member or means is the sole means overlying the lateral projection at the bottom of the rod. My stopper is very easy to assemble and disassemble, is inexpensive and gives long service life.

While I have shown and described certain present preferred embodiments of the invention it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied within the scope of the following claims.

[9] I claim:

* * * * *

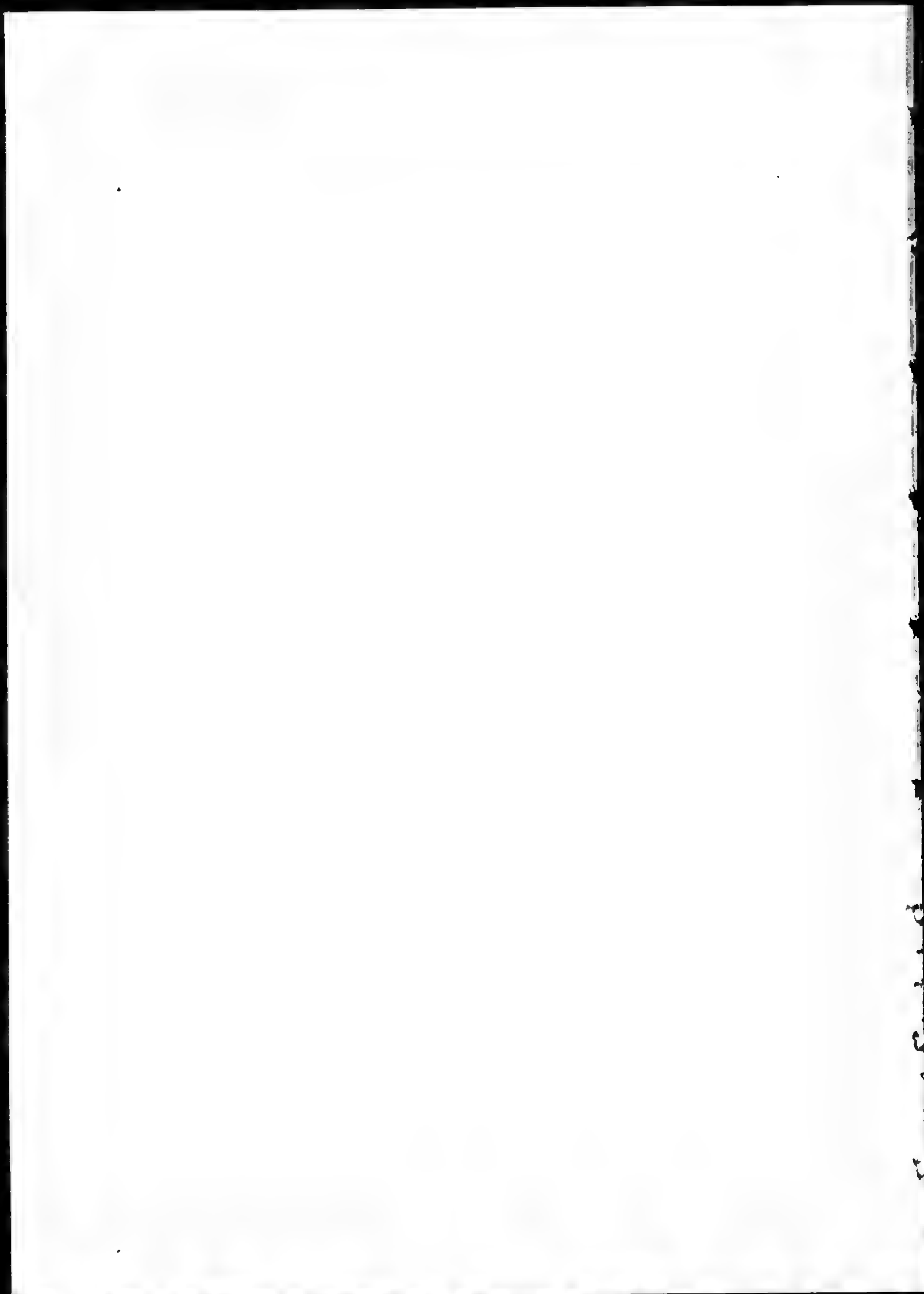
2. A stopper for a ladle or similar receptacle comprising a refractory head having a well extending downwardly thereinto, a rod having a lateral projection at its bottom ~~insertable~~ *inserted** downwardly into the well and means *separate from the head* also ~~insertable~~ *inserted* downwardly into the well above the lateral projection at the bottom of the rod into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well and connected with the head whereby to attach the rod to the head, said means being the sole means overlying the lateral projection at the bottom of the rod.

* * * * *

[12] 8. A stopper for a ladle or similar receptacle comprising a refractory head having a well extending downwardly thereinto, a rod having a lateral projection at its bottom ~~insertable~~ *inserted* downwardly into the well, the well being internally threaded, and externally threaded means ~~adapted to be~~ threaded into the well into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well whereby to attach the rod to the head.

* * * * *

*Crossed out words in claims deleted by amendment; words in italics inserted by amendment.



19 SEP 18

[15] Sheet 1 of the application drawings.

PRINT OF DRAWING AS
ORIGINALLY FILED

(Duplicated in chart
Plaintiffs' Exhibit No. 3)

Fig. 1.

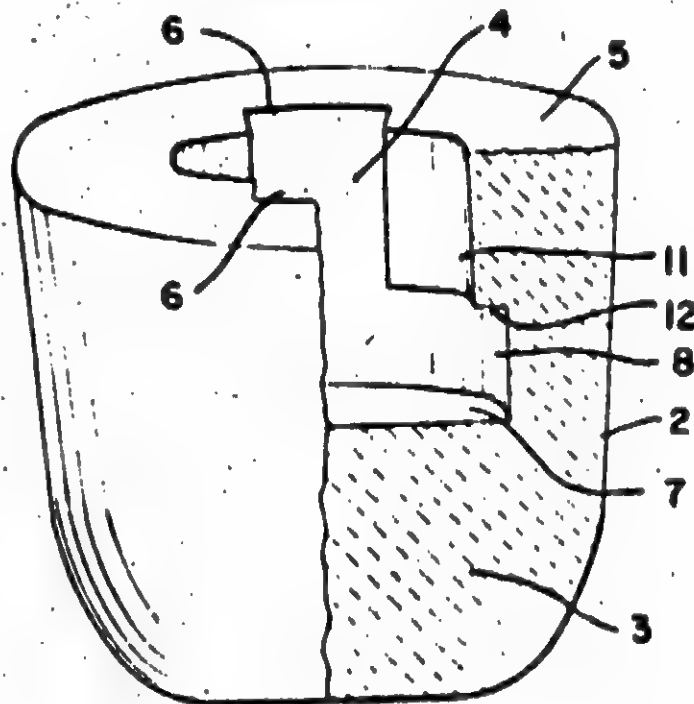


Fig. 2.

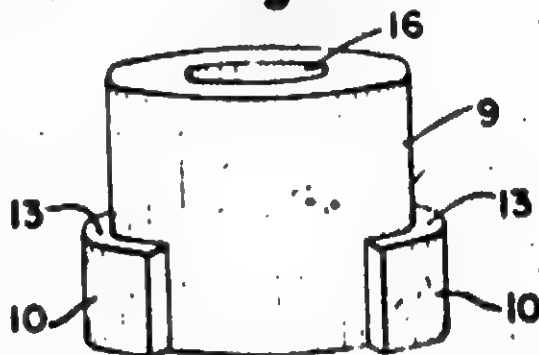


Fig. 3.



INVENTOR
Crawford B. Murton

BY *Hogge & Associates, Inc.*

ATTORNEYS

1923 SEP 18

[16] Sheet 2 of the application drawings.

(Duplicated in chart
Plaintiffs' Exhibit No. 4)

PRINT OF DRAWING AS
ORIGINALLY FILED

Fig. 4.

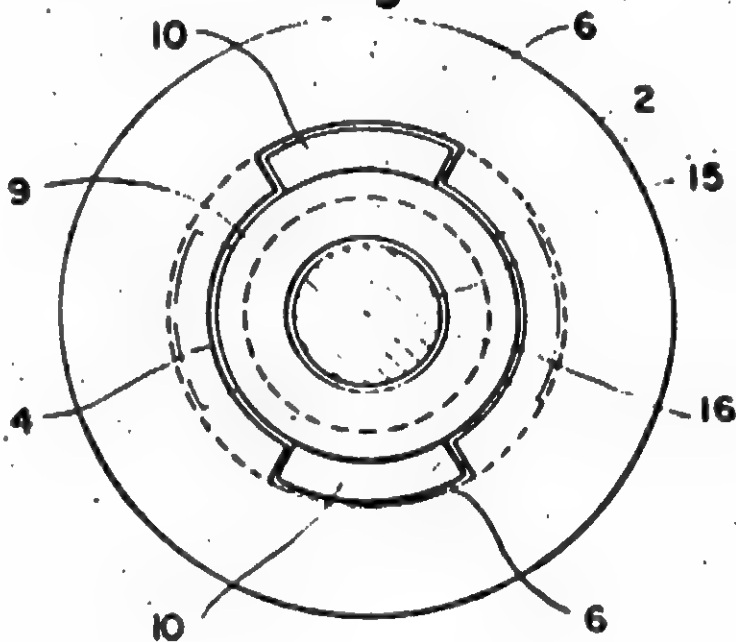
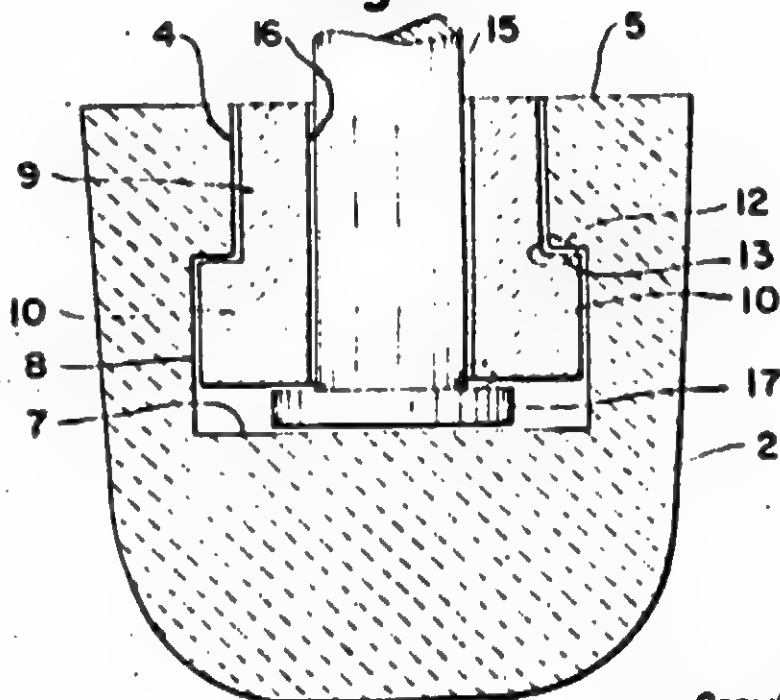


Fig. 5.



INVENTOR.

Crowford B. Murton

BY

John W. Edwards & Co.

ATTORNEYS

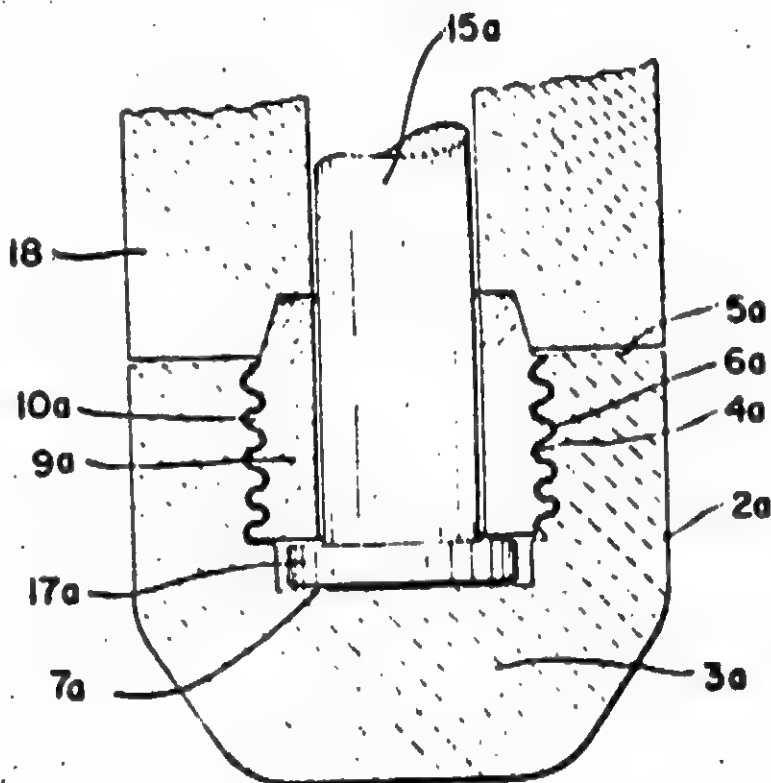
1923 SEP 18

[17] Sheet 3 of the application drawings.

(Duplicated in chart
Plaintiffs' Exhibit No. 5)

PRINT OF DRAWING AS
ORIGINALLY FILED

Fig. 6.



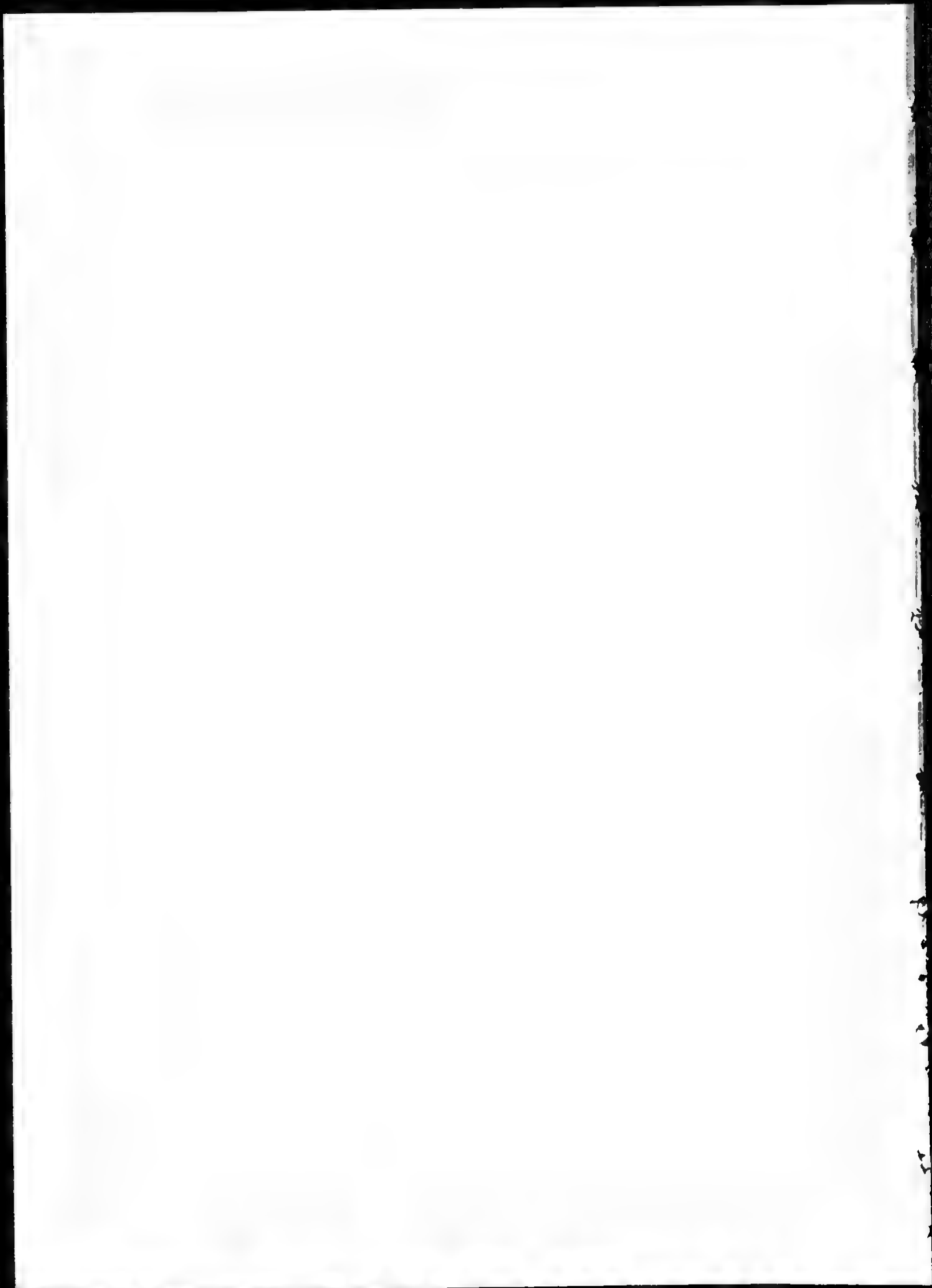
INVENTOR

Crawford B. Murton

BY

James H. H. H. H. H.

ATTORNEYS



Official Action of April 10, 1959

[18] This application has been examined.

References cited:

Brosius et al	1,825,177	Sept. 29, 1931	22/85
Hodge	2,599,832	June 10, 1952	22/85

Art of interest:

Cieslak	2,556,152	June 5, 1951	22/85
Whittaker	2,336,518	Dec. 14, 1943	22/85
Allendorfer	712,111	Oct. 28, 1902	22/85

Claims 1 through 7, 9 and 10 are rejected as unpatentable over Hodge. The patent of Hodge shown at Fig. 2, a ladle stopper comprising a refractory head (20) having a well extending downwardly into said head, a rod (18) extending into said well and means (26) extending over a lateral projection (21) on said rod wherein the said means upon contact with upper well surface prevents withdrawal of the rod from the well. It is noted that the upper portion of the well that is more remote from the bottom has a smaller transverse dimension than the portion that is less remote from the bottom of the said well.

Claim 8 is rejected as unpatentable over Brosius et al. The patent of Brosius et al shows a ladle stopper [19] having a refractory head (10), a well with a rod (12) therein, the said well being internally threaded and externally threaded means (5) threaded unto the head adapted to overlies a lateral projection on the said rod to thereby prevent withdrawal of the rod from the head.

No claim is allowed.

* * * * *

Excerpt From Amendment Filed September 10, 1959

[23] Claim 1 is limited to the means applicable to the head and rod into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block with- [24] drawal of the rod from the well whereby to attach the rod to the head being the sole means overlying the lateral projection at the bottom of the rod. Claim 2 contains a parallel limitation. This is the antithesis of Hodge as in the Hodge patent not only the washer 26 but also the upper portion of the stopper head 14 thereabove overlies the lateral projection at the bottom of the rod.

It is certainly clear, and we are sure that the examiner will agree, that the rejections of the claims in this case are term rejections pure and simple since it is manifest that the references have not the slightest relationship in substance to the inventions claimed by applicant. But in such a situation in order that a rejection may be tenable it is necessary that each claim rejected be clearly readable upon the reference used against it. We agree that it makes no difference how remote a reference may be in substance, it is a proper reference if a claim may be read in terms upon it; but conversely if a claim cannot be read in terms on a reference which is not pertinent in substance the reference is not a proper reference.

We further point out that in claim 2 the means blocking withdrawal of the rod from the well is also defined as being insertable downwardly into the well which again is the antithesis of the disclosure of Hodge whose washer 26 is applied through the bore 22 in the bottom of the stopper head 14.

Official Action of December 17, 1959

[29] Responsive to amendment filed September 10, 1959

Additional references of record:

Bacon	1,719,795	July 2, 1929	22-85
Sears	1,843,175	Feb. 2, 1932	22-85
British patent	12,291	May 31, A.D. 1904	22-85

(1 sht. dwg.; 1 pp. spec.)

The Examiner has read and considered appreciatively the complete and thorough contention of the applicant.

Claims 1-13 are rejected as indefinite as failing to comply with 35 U.S.C. 112. The words "applicable" and "insertable" in regard to the means (10) render the claims indefinite for it appears that the units comprising the ladle stopper are not in an assembled positive combination but are merely parts adapted to be assembled thus the claims fail to define a definite machine within the well known classifiable fields of patentable invention. It is suggested that positive language (e.g. inserted or applied) be used to describe the alleged invention.

Claims 1-7, 9 and 10-13 are again rejected as unpatentable over Hodge and for the reasons as set forth in the rejection of these claims in the last Office action. [30] It is noted with regard to the indefiniteness (supra) that the claims fail to define over Hodge as the claims do not specifically require that the means (10) be inserted into the well portion.

Claims 1-7, 9 and 10 are further rejected as unpatentable over the British patent, Bacon or Sears taken individually. The references respectively show the bore elements of a ladle stopper but more specifically show

separate means (British patent at B², Bacon at 9, and Sears at 29) insertable downwardly into a well portion and adapted to overlie at *least* a portion of a projection at the bottom of the stopper rod. The projection in each case represented in the (British patent at F, Bacon at 2, and Sears at 34). In each and every case the means cooperating with the projection on the stopper rod prevents upward movement of the said rod relative to the head.

Claims 1-7, 9 and 10-13 are rejected.

Claim 8, appears to contain allowable subject matter but stands rejected on the ground of indefiniteness (*supra*).

Amendment Filed March 9, 1960

[31] In response to the official action of December 17, 1959, this application is amended as follows:

* * * * *

Claim 2, line 4, change "insertable" (both occurrences) to —inserted—; same line, after "means" insert —separate from the head—.

* * * * *

[32] Claim 8, line 4, change "insertable" to —inserted—; line 5, cancel "adapted to be".

* * * * *

REMARKS

The examiner's constructive approach toward the case is deeply appreciated.

We have complied fully with the examiner's suggestion to use positive language to obviate the rejection of claims 1-13 on the ground of indefiniteness. The word

"applicable" has been replaced by "applied" and the word "insertable" has been replaced by "inserted" as suggested by the examiner. This has been done throughout the claims. Also in claims 9 and 10 "turnable" has been replaced by "turned". Further, in claim 8, line 5, "adapted to be" has been cancelled. It is believed [33] that these changes fully comply with the spirit of the examiner's suggestion and that the claims as now presented will be found clear and definite and in proper form.

We understand from the paragraph at the bottom of page 1 and the top of page 2 of the official action that the amendments above referred to will obviate the rejection of claims 1-7 and 9-13 on Hodge since the claims now specify that the rod is inserted downwardly into the well.

There remains the rejection of claims 1-7, 9 and 10 on the newly cited references, British patent No. 12291/1904, Bacon and Sears. Before adverting to the further amendments which have been made in the claims to more clearly distinguish from the newly cited references we wish briefly to summarize the disclosures of those references.

The British patent discloses a structure in which a flanged rod is inserted downwardly into a well having an undercut portion at its bottom whereupon the rod is shifted laterally and a locking block B² is inserted to prevent the rod from shifting back to a position in which it might be withdrawn. This is quite different than applicant's structure and involves the provision of an eccentric well in the stopper head in order that the rod when in operative position will be coaxial with

the head. The result is that the wall of the stopper head is undesirably thin at one side as shown in Fig. 5 of the drawings of the British patent; also, the only means holding the rod E against withdrawal is the overhung portion of the well at the right-hand side of the head viewing Fig. 5. The only function of the locking block B² is to prevent lateral shifting of the rod relatively to the head; the locking block B² has no holding down function whatever.

[34] Bacon and Sears are alike in that they require the use of a special rod which engages a pre-positioned element near the bottom of the well in the stopper head by a bayonet slot action. The connection thus afforded is less strong and secure than when a conventional stopper rod having a circular flange at its bottom is utilized.

The quantity of ladle stopper heads consumed in a year by the United States steel industry may be estimated in the millions. The stopper head is subject to rapid deterioration and erosion by the molten steel and slag flowing in contact with it. On the other hand the steel stopper rods have a long life and are used many times. The stopper rods are insulated and protected by the head and sleeves of refractory material. Stopper rods of the type shown in applicant's drawings, i.e., having a circular flange at the bottom, are conventional and standard and are used by virtually all steel companies. Various styles of stopper heads are used. A stopper head requiring the provision of a special rod as in Bacon or Sears is not desirable and as mentioned above does not provide as strong and secure a stopper structure as when a conventional stopper rod is employed.

It is clear without argument that a conventional stopper rod could not be used at all in either Bacon or Sears. The very functioning of the structures of those patents is dependent upon the provision of a rod having a pin-like projection at its bottom which can be inserted through a pre-positioned member at the bottom of the well and then turned in bayonet slot fashion to holding position.

All of applicant's claims even as previously presented distinguished in terms from the references as we understand that [35] the examiner appreciated since he did not reject claims 1-7, 9 and 10 on the ground that they are met by the newly cited references but simply as "unpatentable" thereover. We carefully noted that the examiner did not include claims 11-13 in the rejection and a comparison of claims 1-7, 9 and 10 on the one hand with claims 11-13 on the other hand revealed that claims 11-13 as originally presented contained the limitation that the rod holding means are "separate from the head". Apparently the examiner recognized that limitation as clearly distinguishing claims 11-13 from the newly cited references. We have similarly amended claims 1-7, 9 and 10. In both Bacon and Sears the rod holding means are a pre-positioned part of the head and are not separate from the head as in the case of applicant's rod holding means. We have demonstrated above the advantages of applicant's structure over Bacon and Sears and now that claims 1-7, 9 and 10 have been amended conformably to claims 11-13 we hope that the rejection thereof on the newly cited references will be obviated.

We further point out that in a number of the claims we have also inserted the limitation that the rod holding

means are inserted downwardly into the well upon insertion of the rod. While this limitation is not believed to have been necessary to distinguish from Bacon and Sears it serves to point up a clear distinction over those references in that in the references the pre-positioning of the rod holding means is essential whereas in applicant's structure the rod holding means must be inserted downwardly into the well upon insertion of the rod, i.e., either contemporaneously with or after insertion of the rod.

We note upon a final review of the claims that claim 7 is somewhat different from the other rejected claims in that [36] it specifies cooperating preformed elements fitting together to at least largely surround the rod above the lateral projection thereon applied to the head into position to overlies at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well whereby to attach the rod to the head. The references do not disclose the provision of such cooperating preformed elements fitting together as specified and we suggest that this limitation of claim 7 may have been overlooked by the examiner when rejecting the claims on the newly cited references.

We thank the examiner for the finding that claim 8 contains allowable subject matter. The claim has been amended in accordance with the examiner's suggestion to avoid the rejection on the ground of indefiniteness and we understand that it will now be deemed to stand allowed.

We hope that all of claims 1-7 and 9-13 will be found allowable as now presented in view of the above argument. We solicit issuance of the notice of allowance at the examiner's early convenience.

Official Action of April 15, 1960

[37] Responsive to amendment filed March 9, 1960.

Claims 1-7, 9 and 10-13 are again rejected as unpatentable over the British patent, Bacon or Sears taken individually. The Examiner takes issue with applicant's assertion that the "locking block B² has no holding down function whatever" in the British patent, for it is apparent that as stopper sleeves are positioned over the stopper end then in fact the stopper rod will be locked in place with the aid of block B². The reference of Bacon shows how the sleeves (4) are loaded upon the stopper end portion (5). The claims merely recite a "means separate from the head" and positioned "to overlie at least a portion of the lateral projection at the bottom of the rod" which is true of the references of record. No special limitation as to shape has been given to this means thus the claims fail to even define structurally over the references of record.

Claims 1-7, 9 and 10-13 are rejected.

Claim 8 is at present deemed allowable.

As an issue has been reached this is a *FINAL* rejection.

Official Action of May 27, 1960

[42] Responsive to amendment filed May 18, 1960.

The proposed amendment of May 18, 1960 has not been entered as it fails to place the application in condition for allowance. Claims 1-7, 9 and 10-14 are not patentable over the references as applied in the Final rejection. The Examiner again re-affirms the position taken in the prior Office action in that the references of record taken individually show a means overlying the lateral projection of a stopper rod thus blocking the withdrawal of the rod from a well formed in the head portion of the stopper assembly. It is noted that any object located in the path of a second object will block withdrawal of the latter. The amendment will be entered for purposes of appeal if applicant so requests.

The six-months period for a statutory response runs from the date of the *Final* rejection.

Proposed Amendment Filed July 8, 1960

(Not entered)

[49] The official action of June 21, 1960, has been received. In response thereto and in response to the official actions of April 15, 1960, and May 27, 1960, and for the purpose of placing the application in condition for allowance it is respectfully requested that the application be amended as follows:

Cancel all the claims except allowed claim 8.

Add the following claim:

—14. A stopper for a ladle or similar receptacle comprising a refractory head having a well extending

downwardly thereinto, a rod having a lateral projection at its bottom inserted downwardly into the well, the well being defined by a wall having a first portion spaced above the bottom of the well extending inwardly relatively to a second portion of the wall therebelow, and attaching means separate from the rod and head inserted downwardly into the well having a first position overlying the lateral projection at the bottom of the rod and a second portion underlying said first portion of the wall defining the well whereby to block withdrawal of the rod from the well and [50] thereby attach the rod to the head, said first portion of the wall being interrupted circumferentially providing channel means through which the second portion of said attaching means passes when said attaching means is inserted downwardly into the well, said second portion of said attaching means having its transverse dimension less than that of the channel means to enable said second portion of said attaching means to pass downwardly through said channel means.—.

REMARKS

The proposed new claim has been revised so as to obviate the examiner's objections to the form of the claim as originally presented and also so as to more clearly define features of applicant's invention over the references.

The new claim—claim 14—as now presented is specific to a stopper for a ladle or similar receptacle comprising a refractory head having a well extending downwardly thereinto, a rod having a lateral projection at its bottom inserted downwardly into the well, the well being defined by a wall having a first portion spaced above the bottom of the well extending inwardly rela-

tively to a second portion of the wall therebelow, and attaching means separate from the rod and head inserted downwardly into the well having a first portion overlying the lateral projection at the bottom of the rod and a second portion underlying said first portion of the wall defining the well whereby to block withdrawal of the rod from the well and thereby attach the rod to the head, said first portion of the wall being interrupted circumferentially providing channel means through which the second portion of said attaching means passes when said attaching means is inserted downwardly into the well, said second portion of said attaching means having [51] its transverse dimension less than that of the channel means to enable said second portion of said attaching means to pass downwardly through said channel means. No such stopper is disclosed or taught by the references.

In neither of Bacon and Sears does the member referred to by the examiner in the official action of June 21, 1960—29 in Sears and 9 in Bacon—have its transverse dimension less than that of channel means in the wall defining the well to enable 29 or 9 to pass downwardly through such channel means. The examiner will note that the plate 29 of Sears must apparently be molded into the so-called needle 20 as there is no other way of getting the plate into the position shown in the Sears patent. This presents an extremely difficult problem of positioning the plate and molding the needle around it which is entirely obviated by applicant's invention.

Likewise in Bacon the inserts 9 do not have their transverse dimensions less than that of channel means in the wall defining the well to enable the inserts 9 to

pass downwardly through such channel means. It is not clear from the Bacon patent how the inserts 9 are put in place but it would appear that they, like the plate 29 of Sears, are molded into the head 5 when the head is formed.

The British patent does not have a structure responding either in terms or in substance to the claim which specifically calls for the well as being defined by a wall having a first portion spaced above the bottom of the well extending inwardly relatively to a second portion of the wall therebelow and specifies attaching means separate from the rod and head inserted downwardly into the well having a first portion overlying a lateral projection at the bottom of the rod and a second portion underlying the first portion of the wall defining the well whereby to block withdrawal of the rod from the well and thereby attach the rod to the head. The examiner states in [52] the official action of June 21, 1960, that the British patent shows a locking means B² that is inserted downwardly into the well through an interrupted circumferentially provided space in the wall defining the well, but such means do not have any portion underlying any portion of the wall defining the well. Applicant provides for a much stronger connection between the rod and head than is provided for by the British patent. At the same time applicant completely avoids the necessity of molding in portions such as the plate 29 of Sears and the inserts 9 of Bacon.

We respectfully submit that claim 14 as set forth above properly distinguishes from all of the references both in terms and in substance and its allowance along with previously allowed claim 8 is respectfully solicited.

Affidavit of T. H. Harley

[53]

(Filed October 10, 1960)

Commonwealth of Pennsylvania }
County of Allegheny } ss.:

T. H. Harley, having been first duly sworn according to law, deposes and says as follows:

1. I am president of Vesuvius Crucible Company of Swissvale, Pennsylvania, which is a manufacturer of refractories for the steel industry, including ladle stoppers. Vesuvius Crucible Company is the assignee of the above identified application for United States patent.

2. The invention of the above identified application has gone into wide and successful use in the steel industry of the United States. Approximately 250,000 ladle stoppers made in accordance with the invention have been used in ladles pouring over 50,000,000 tons of steel in the United States alone. The invention has also gone into substantial use in foreign countries.

3. Ladle stoppers made in accordance with the invention have been adopted as standard equipment in the great majority of the plants of United States Steel Corporation and Bethlehem Steel Company, the No. 1 and No. 2 steel producers in the United States. The invention is also largely utilized by [54] Republic Steel Corporation, Jones & Laughlin Steel Corporation, National Steel Corporation, The Youngstown Sheet and Tube Company, Inland Steel Corporation, Granite City Steel Company, McLouth Steel Corporation, Kaiser Steel Corporation and others. At least 60% of all ingot tonnage poured in the United States is poured through ladles

equipped with stoppers made in accordance with the invention.

4. The invention provides improved pouring performance and minimized stopper maintenance. The ladle stopper of the invention is the strongest and most secure assembly ever devised. The elements may be assembled and disassembled with unprecedented ease. The elements of the ladle stopper assembly may be produced at low cost as compared with competitive ladle stoppers. The invention results in greatly increased stopper head and stopper rod life. The invention allows for considerable deformation of the flange at the bottom of the stopper rod while still functioning perfectly which is not true of competitive ladle stoppers.

T. H. HARLEY

Sworn to and subscribed before me, a notary public in and for the said county and commonwealth, this 6th day of October, 1960.

MRS. BETTY T. FLETCHER

Notary Public

[NOTARIAL SEAL]

Swissvale, Allegheny Co.,
Pennsylvania

My Commission Expires March 21, 1964.

Excerpt From Amendment Filed October 10, 1960

[55] Cancel claims 1, 3, 4, 6, 10 and 11.

Appeal to the Board of Appeals

(Filed October 11, 1960)

[56] Applicant hereby appeals to the Board of Appeals from the decision of the principal examiner finally rejecting claims 2, 5, 7, 9, 12 and 13.

An oral hearing is requested.

The appeal fee of \$25.00 is submitted herewith.

Official Action of October 26, 1960

[57] Responsive to communications filed July 8, 1960 and October 10, 1960.

The proposed amendment of October 10, 1960 has been entered as it places the application in better condition for appeal. It is noted in view of the proposed amendment (*supra*) and the appeal to the Board of Appeals that the amendment of July 8, 1960 was not intended to be entered and thus has not been entered in the instant application. The affidavit of T. H. Harley submitted in conjunction with the proposed amendment of October 10, 1960 has been given careful consideration but is not deemed persuasive as to the ultimate issue of patentability. Though applicant's affidavit purports to establish the commercial acceptability of the instant device it remains that such commercial success is mere evidence as to the ultimate issue of patentability. Many decisions support in varying terms the proposition that applicant must demonstrate that his device produces "new and useful results never before attained" (*Blanchard v. Ooms* 1946 C.D. 22; 62 U.S.P.Q. 314.) It is noted that the instant affidavit is deficient on the singularly important point of whether the applicant's advice is superior to those disclosed in the art of record.

Affidavit of T. H. Harley

[58] (Filed December 2, 1960)

Commonwealth of Pennsylvania } ss.:
County of Allegheny

T. H. Harley, having been first duly sworn according to law, deposes and says as follows:

1. I am the T. H. Harley who on October 6, 1960, made an affidavit heretofore filed in the above identified application of Crawford B. Murton for United States patent for Stopper For a Ladle or Similar Receptacle.

2. In view of the last sentence of the official action of October 26, 1960, I submit the following discussion as to the references relied upon by the examiner in the Murton application, to wit, British patent No. 12291/1904, Bacon United States patent No. 1,719,795 and Sears United States patent No. 1,843,175 .

3. Serious problems arise in the manufacture of the stopper of British patent No. 12291/1904. The stopper head of the British patent necessarily has an eccentric well resulting in uneven shrinkage of the refractory mass in the drying and burning operation which in turn makes the stopper head peculiarly susceptible to the formation of internal cracks. In view of this situation prohibitively large dimensional tolerances have to be provided to make sure that the components can be assembled as intended. Such large tolerances reduce the efficiency of the locking block B². It is well established that grossly asymmetrical shapes such as the stopper head of the British patent are undesirable for the reasons which I have stated, yet the

British patentee was unable to solve the problem otherwise.

4. The British patent discloses a stopper head having an eccentric well into which a flanged rod is inserted, the well having an undercut portion adjacent its bottom at one side so that after the flanged rod is inserted it is shifted laterally and the locking block B² is inserted to prevent the rod from shifting back to a position in which it might be withdrawn. The wall of the stopper head is dangerously thin at one side as is clearly shown in Fig. 5 of the drawings; also, the only means holding the rod E against withdrawal is the overhung portion of the well at the right hand side of the head viewing Fig. 5. The only function of the locking block B² is to prevent lateral shifting of the rod relatively to the head; it has no holding down function whatever.

5. While the official action of June 21, 1960, states that "the British patent shows a locking means (B²) that is inserted downwardly into the well through an interrupted circumferentially provided space in the wall defining a well", the locking means B² does not have any portion underlying any portion of the wall defining the well and does not function analogously to the Murton structure.

6. To illustrate that the so-called locking block B² of the British patent does not function as a connecting [60] component between the stopper head D and the rod E, consider that the stopper head D is cracked in a curved vertical plane conforming to the outer diameter of flange F, which is a distinct possibility if not a probability. If then the stopper head D is held immovable,

as by metal frozen about the tapping hole of the ladle, and upward force is exerted on the rod E the block B² will not prevent withdrawal of the rod E. The only portion of the structure of the British patent which prevents rod E from being withdrawn from the stopper head D is the 180° overhang of the undercut portion of the stopper head.

7. The structure of the British patent causes problems which arise in the pouring of molten steel. The undercut portion of the head must be made oversize in thickness to accommodate the rod flange F, since in service the flange tends to become warped and deformed through repeated use. A minimum of $\frac{1}{8}$ " clearance must be provided for under actual operating conditions. Consequently the head D will be loosely affixed to the rod E having the flange F until the sleeves are assembled on the rod and the nut at the upper end of the rod is tightened to exert downward force on the sleeves causing downward pressure on the right hand side of the stopper head D, viewing Fig. 5. In other words, until stress or force is applied to the stopper head there is a loosely fitting assembly. The application of stress to the right hand portion of the stopper head, viewing Fig. 5, augments the intense thermal shock to which the stopper is subjected when molten steel is poured into the ladle, the result being a tendency to crack the head which indeed is very likely to occur in the structure of the British patent.

[61] 8. The Murton stopper head is much stronger than that of the British patent and much less likely to crack in use. The bearing between the rod flange and the stopper head is not concentrated at one side only of the rod flange and the well in the stopper head is not

eccentric as is the British patent. In the British patent there is grave danger of fracture of the stopper head when the rod is pulled upwardly because the force exerted by the rod is concentrated at one side of the head. The opposite is true in Murton in which the force exerted by the rod is distributed rather than concentrated at one side. Also, in the British patent the stopper head D is subjected to concentration of stress induced by the force exerted by the nut at the top of the rod which is transmitted through the sleeves surrounding the rod. This must be resorted to to overcome the loose fit between the head D the rod E with the flange F and the locking block B². The stress will concentrate at the top of the undercut portion of the head and will radiate upwardly. When high thermal stress is superimposed on the mechanical stress rupture of the head is probable.

9. A major United States steel producer tested the stopper head of the British patent in both of the forms shown in the drawings of that patent and found neither satisfactory. The stopper head cracked and broke off during pouring of steel into the ladle. That producer is now using the Murton stopper.

10. The Bacon patent No. 1,719,795 discloses what the patentee calls a "bayonet joint ladle stopper" in which the head is "attached to the rod by turning it so that the transverse metal pin engages the horizontal slot in the stopper." Bacon provides metal channel inserts 9 (see Fig. [62] 4 of Bacon's drawing) which he states are mounted in the grooves 7 in which the ends of the pin 2 operate and which are for the purpose of taking the strain when the rod 1 is moved in a vertical direction.

11. The Bacon structure is impractical from both the manufacturing standpoint and the operational stand-

point, and this has been proved in actual practice. The cross-sectional area of Bacon's pin 2 is so limited that the pin may either shear or soften and bend when subjected to the heat of molten metal when the rod 1 is pulled upwardly to unseat the stopper head from the tapping hole of the ladle where it may be tightly held by solidified metal. It would not be possible to materially increase the cross-sectional area of the pin 2 since that would require correspondingly increasing the cross-sectional area of the hole in the rod 1 which receives the pin 2 and would result in weakening the rod 1 to the extent that the rod itself might fracture. Also in a structure of this type in which the pin is inserted through a hole in the rod the pin attains a very high temperature when molten steel is poured and the conductivity between the pin and the rod is not great enough to conduct heat away from the pin to cool it sufficiently to inhibit its being sheared or bent.

12. The provision of the metal channel inserts 9 of Bacon introduces a problem both in formation of the stopper head and in use of the stopper which Bacon did not solve. The patent is silent as to whether the metal channel inserts 9 are molded into the head 5 when the head is formed or whether the inserts are put in place after the head is molded and burned. The shape of the inserts and the shape of the well in [63] the head are such that it would be extremely difficult if not completely impossible to put the inserts in place after molding and burning of the head. But if the inserts are to be molded into the head when the head is formed the temperature to which the head is subjected in burning is so great that the inserts will be either melted or at least softened so that they will become deformed and not perform their

intended function. Furthermore, when the Bacon stopper is used for the pouring of steel the heat of the molten steel will either melt or deform the metal channel inserts 9 or will cause them to weld to the pin 2. Bacon recites in his patent, page 1, lines 9 through 37, some major deficiencies of the bayonet joint type ladle stopper and his remarks are pertinent to the deficiencies of the Bacon ladle stopper and the superiority of the Murton ladle stopper. In spite of the incorporation of the channel inserts 9 into the Bacon ladle stopper it is still necessary that the assembly of the Bacon stopper head, plurality of sleeves and stopper rod be in a compressed or stressed state to have that assembly function properly in the steel pouring operation; thus mechanical stress concentration exists in stopper head 5 after assembly. When molten steel surrounds stopper head 5 the severe thermal stress induced will act on the zone of mechanical stress concentration in stopper head 5 and will be additive with the concentrated mechanical stress. In consequence vertical ruptures of stopper head 5 of Bacon occur generally along the plane containing the axis of the cross pin 2. Such ruptures may result in total failure of the stopper head or in localized erosion when only minor fissures occur. This has been proved to be the case by actual tests made by a leading steel producer. The contrary is true in Muron in which the stress concentration of Bacon does not exist.

[64] 13. The Sears patent No. 1,843,175 is in the same general category as the Bacon patent and the above statements relative to Bacon apply generally to Sears. Sears forthrightly admits that his plate 29 can only be embodied in the stopper head by being molded into the head when the head is formed. The plate is subject to

the same defects and disadvantages during formation of the head and during the pouring of steel in a ladle in which the stopper is utilized as in the case of the channel inserts 9 of Bacon.

T. H. HARLEY

Sworn to and subscribed before me, a notary public in and for the said county and commonwealth, this first day of December, 1960.

CHARLES E. BAUER

[NOTARIAL SEAL]

Notary Public

Brief for Applicant

(Filed March 21, 1961)

[71] THE APPEALED CLAIMS

The appealed claims are:

2. A stopper for a ladle or similar receptacle comprising a refractory head having a well extending downwardly thereinto, a rod having a lateral projection at its bottom inserted downwardly into the well and means separate from the head also inserted downwardly into the well above the lateral projection at the bottom of the rod into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well and connected with the head whereby to attach the rod to the head, said means being the sole means overlying the lateral projection at the bottom of the rod.

5. A stopper for a ladle or similar receptacle comprising a refractory head having a well extending down-

wardly thereinto, the well having a portion of its wall relatively remote from its bottom of smaller transverse dimension than a portion of its wall less remote from its bottom, forming a shoulder facing toward the bottom of the well, a [72] rod having a lateral projection at its bottom inserted downwardly into the well and means separate from the head inserted downwardly into the well upon insertion of the rod interposed between said shoulder and the lateral projection at the bottom of the rod blocking withdrawal of the rod from the well whereby to attach the rod to the head.

7. A stopper for a ladle or similar receptacle comprising a refractory head having a well extending downwardly thereinto, a rod having a lateral projection at its bottom inserted downwardly into the well and cooperating preformed elements fitting together to at least largely surround the rod above the lateral projection thereon applied to the head into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well whereby to attach the rod to the head.

9. A stopper for a ladle or similar receptacle comprising a refractory head having a well extending downwardly thereinto, the well having at a portion of its periphery a shoulder facing toward the bottom of the well, a rod having a lateral projection at its bottom inserted downwardly into the well and means separate from the head also inserted downwardly into the well into position to overlie at least a portion of the lateral projection at the bottom of the rod and turned to a position in which a part thereof underlies said shoulder to block withdrawal of the rod from the well and thereby attach the rod to the head.

12. Means for application to a ladle stopper rod having a lateral projection at its bottom to form a ladle stopper, said means comprising a refractory head having a well extending downwardly thereinto having a downwardly facing [73] shoulder and means separate from the head applied to the head and rod downwardly through said well into position to underlie at least a portion of said shoulder and overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well whereby to attach the rod to the head.

13. The combination of the means defined by claim 11 and additional means holding said head and said separate means against substantial relative movement to insure maintaining the rod attached to the head.

THE REFERENCES

The references are:

Bacon	1,719,795
Sears	1,843,175
British patent	12,291/1904

Each of the rejected claims is rejected on each of the references considered individually.

THE INVENTION

The invention has to do with the fastening of a ladle stopper head to a ladle stopper rod. It involves a new combination of elements whereby an exceptionally strong connection is formed between the rod and head by a structure of great simplicity and low cost.

Two forms of the invention are shown in the drawings, one form in Figures 1-5 and the other form in Fig-

ure 6. In each case a conventional steel stopper rod is employed. In Figure 5 the stopper rod is designated by reference numeral 15 having an integral flange 17 at its bottom. In Figure 6 the stopper rod is designated 15a having an integral flange 17a at its bottom. In each case the stopper head (2 in Figure [74] 5; 2a in Figure 6) has a well extending downwardly into the head from its top, the well being designated 4 in Figure 5 and 4a in Figure 6. In each case the well is formed with a downwardly facing shoulder utilized in combination with means presently to be described to maintain the connection between the rod and head. In Figure 5 the shoulder is designated 12, having opposed portions separated by outwardly projecting portions or channels 6 of the well 4 (see also Figure 1). In Figure 6 the well 4a is provided with an internal thread 6a, the downwardly facing surface of the thread 6a constituting the shoulder analogous to the shoulder 12 of Figure 5. The rod 15 or 15a is introduced downwardly into the well 4 or 4a of the head into the position shown in Figure 5 or Figure 6 as the case may be.

In Figure 5 the rod 15 is held in place in the well 4 by a lugged insert ring 9 having opposed outwardly projecting lugs 10. The lugged insert ring 9 is slid downwardly about the rod 15, the lugs passing downwardly through the channels 6 until the lugs are disposed at a level below the shoulders 12, at which time the lugged insert ring 9 is turned through an angle of 90° to position the lugs 10 beneath the shoulders 12 as shown in Figure 5. The lugged insert ring 9 is disposed atop the flange 17 of the rod 15 as shown in Figure 5 and thus constitutes means connecting the rod to the head. A locking member 14 (Figure 3) may be introduced into

one of the channels 6 after the lugged insert ring has been inserted and turned through 90° as above described, the locking member 14 preventing turning of the lugged insert ring back to the position in which it might be withdrawn. Thus the lugged insert ring 9 cooperating with the shoulders 12 of the [75] well 4 of the head 2 and with the flange 17 of the rod 15 maintains the head and rod assembled.

In the form of Figure 6 the head and rod are maintained assembled by an externally threaded collar 9a which may be in one piece or in two or even more than two pieces (as may the lugged insert ring 9 of the form of Figures 1-5) surrounding the rod 15a. The collar 9a is turned and by reason of the mating of its threads 10a with the threads 6a of the well 4a the collar threads home to the position shown in Figure 6 overlying the flange 17a of the rod 15a, thus maintaining the rod and head assembled.

Thus in each case the rod and head are maintained in assembly by the holding member — the lugged insert ring 9 of Figure 5 and the collar 9a of Figure 6 overlying the flange of the stopper rod and bearing upwardly against a downwardly facing shoulder in the well of the head. As above explained, in Figure 5 the downwardly facing shoulder is constituted by the opposed shoulder portions 12 while in Figure 6 the downwardly facing shoulder is the downwardly facing surface of the thread 6a.

Note that in both cases the holding force holding the rod and head assembled is distributed about the head and is not concentrated at one side of the head as in the British reference referred to hereinafter; nor is a pro-

jecting pin or a molded-in metal member relied on to maintain the assembly as in the Bacon and Sears references referred to hereinafter. Also note that the well is coaxial with the head and that all parts of the well are of greater diameter than the flange of the rod (which is not true in any reference), facilitating insertion of the rod into the head.

[76] As set forth in the affidavit of T. H. Harley dated October 6, 1960, the invention has gone into wide and successful use in the steel industry of the United States. Approximately 250,000 ladle stoppers made in accordance with the invention have been used in ladles pouring over 50,000,000 tons of steel in the United States alone. The invention has also gone into substantial use in foreign countries.

Mr. Harley's affidavit of October 6, 1960, further states that ladle stoppers made in accordance with the invention have been adopted as standard equipment in the great majority of the plants of United States Steel Corporation and Bethlehem Steel Company, the No. 1 and No. 2 steel producers in the United States, and that the invention is also largely utilized by Republic Steel Corporation, Jones & Laughlin Steel Corporation, National Steel Corporation, The Youngstown Sheet and Tube Company, Inland Steel Corporation, Granite City Steel Company, McLouth Steel Corporation, Kaiser Steel Corporation and others. At least 60% of all ingot tonnage poured in the United States is poured through ladles equipped with stoppers made in accordance with the invention.

The invention provides improved pouring performance and minimized stopper maintenance. The ladle

stopper of the invention is the strongest and most secure assembly ever devised. The elements may be assembled and disassembled with unprecedented ease. The elements of the ladle stopper assembly may be produced at low cost as compared with competitive ladle stoppers. The invention results in greatly increased stopper head and stopper rod life. The invention allows for considerable deformation of the flange at the bottom of the stopper rod while still functioning perfectly, which is not [77] true of competitive ladle stoppers.

THE PRIOR ART

British Patent No. 12291/1904

The British patent discloses a stopper rod E having a flange F at its bottom and a stopper head D having a rod head hole B or B' and a rod hole A or A', Figures 1 and 3. At the bottom of the rod hole is an undercut portion, not numbered, disposed at the opposite side of the rod hole from the rod head hole into which a portion of the rod flange F is adapted to move when the rod is introduced downwardly through the rod head hole and then shifted laterally into the rod hole as shown in Figure 5. Thereafter the locking block B² is inserted into the position shown in Figure 5 to fill up the rod head hole and prevent lateral shifting movement of the rod E toward the left viewing Figure 5, thus maintaining the rod in the rod hole with a portion of the flange F in the undercut portion of the head.

The British patent was discussed at length by Mr. Harley in his affidavit dated December 1, 1960. Serious problems arise in the manufacture of the stopper of the British patent. The stopper head of the British patent

in order that the rod and head will be coaxial when in operative position necessarily has an eccentric well (which is constituted by the rod hole and rod head hole considered collectively). Such eccentric well results in uneven shrinkage of the refractory mass in the drying and burning operation which in turn makes the stopper head peculiarly susceptible to the formation of internal cracks. In view of this situation prohibitively large dimensional tolerances have to be provided to make sure that the components can be assembled as intended. Such large tolerances reduce the efficiency of the locking block B². [78] As stated by Mr. Harley, it is well established that grossly asymmetrical shapes such as the stopper head of the British patent are undesirable for the reasons just stated, yet the British patentee was unable to solve the problem otherwise.

In the British patent the wall of the stopper head is dangerously thin at one side (the left hand side) as is clearly shown in Figure 5 of the drawings; also, the only means holding the rod E against withdrawal is the overhung portion of the well at the right hand side of the head viewing Figure 5. The only function of the locking block B² is to prevent lateral shifting of the rod relatively to the head; it has no holding down function whatever.

While in the official action of June 21, 1960, the examiner states that "the British patent shows a locking means (B²) that is inserted downwardly into the well through an interrupted circumferentially provided space in the wall defining a well," the locking means B² does not have any portion underlying any portion of the wall defining the well and does not function analogously to applicant's lugged insert ring 9 or collar 9a.

To illustrate that the so-called locking block B² of the British patent does not function as a connecting component between the stopper head D and the rod E, consider that the stopper head D is cracked in a curved vertical plane conforming to the outer diameter of flange F, which is a distinct possibility if not a probability. If then the stopper head D is held immovable, as it often is by metal frozen about the tapping hole of the ladle, and upward force is exerted on the rod E, the block B² will not prevent withdrawal of the rod E. The only portion of the structure of the British patent which [79] prevents rod E from being withdrawn from the stopper head D is the overhang above the undercut portion of the stopper head which cannot exceed about half the periphery of the flange F because of the necessity of providing the rod head hole for insertion of the headed rod.

The structure of the British patent causes problems which arise in the pouring of molten steel. The undercut portion of the head must be made oversize in thickness to accommodate the rod flange F since in service the flange tends to become warped and deformed through repeated use. A minimum of $\frac{1}{8}$ " clearance must be provided for under actual operating conditions. Consequently the head D will be loosely affixed to the rod E having the flange F until the sleeves are assembled on the rod and the nut at the upper end of the rod is tightened to exert downward force on the sleeves (conventional practice; see Bacon and Sears) causing downward pressure on the right hand side of the stopper head D viewing Figure 5 of the British patent. In other words, until stress or force is applied to the stopper head there is a loosely fitting assembly. The application of stress

to the right hand portion of the stopper head viewing Figure 5 of the British patent augments the intense thermal shock to which the stopper is subjected when molten steel is poured into the ladle, the result being a tendency to crack the head which indeed is very likely to occur in the structure of the British patent.

As further pointed out in the affidavit of Mr. Harley dated December 1, 1960, applicant's stopper head is much stronger than that of the British patent and much less likely to crack in use. The bearing between the rod flange and the stopper head is not concentrated at one side only of the rod [80] flange and the well in the stopper head is not eccentric as in the British patent. In the British patent there is grave danger of fracture of the stopper head when the rod is pulled upwardly because the force exerted by the rod is concentrated at one side of the head. The opposite is true in applicant's structure in which the force exerted by the rod is distributed rather than concentrated at one side. Also, in the British patent the stopper head D is subjected to concentration of stress induced by the force exerted by the nut at the top of the rod which is transmitted through the sleeves surrounding the rod. This must be resorted to to overcome the loose fit between the head D, the rod E with the flange F and the locking block B². The stress will concentrate at the top of the undercut portion of the head and will radiate upwardly. When high thermal stress is superimposed on the mechanical stress rupture of the head is probable.

Mr. Harley further states in his affidavit of December 1, 1960, that a major United States steel producer tested the stopper head of the British patent in both of the forms shown in the drawings of that patent and

found neither satisfactorily. The stopper head cracked and broke off during pouring of steel into the ladle. That producer is now using the stopper of the present application.

Bacon Patent No. 1,719,795

The Bacon patent discloses what the patentee calls a "bayonet joint ladle stopper" in which the head is "attached to the rod by turning it so that the transverse metal pin engages the horizontal slot in the stopper." Bacon provides metal channel inserts 9 (see Figure 4 of Bacon's drawings) [81] which he states are mounted in the grooves 7 in which the ends of the pin 2 operate and which are for the purpose of taking the strain when the rod 1 is moved in a vertical direction.

As pointed out by Mr. Harley in the affidavit dated December 1, 1960, the Bacon structure is impractical from both the manufacturing standpoint and the operational standpoint, and this has been proved in actual practice. The cross-sectional area of Bacon's pin 2 is so limited that the pin may either shear or soften and bend when subjected to the heat of molten metal when the rod 1 is pulled upwardly to unseat the stopper head from the tapping hole of the ladle where it may be tightly held by solidified metal. It would not be possible to materially increase the cross-sectional area of the pin 2 since that would require correspondingly increasing the cross-sectional area of the hole in the rod 1 which receives the pin 2 and would result in weakening the rod 1 to the extent that the rod itself might fracture. Also in a structure of this type in which the pin is inserted through a hole in the rod the pin attains a very high temperature when molten steel is poured and the conductivity between the

pin and the rod is not great enough to conduct heat away from the pin to cool it sufficiently to inhibit its being sheared or bent.

The provision of the metal channel inserts 9 of Bacon, Mr. Harley states, introduces a problem both in formation of the stopper head and in use of the stopper which Bacon did not solve. The patent is silent as to whether the metal channel inserts 9 are molded into the head 5 when the head is formed or whether the inserts are put in place after [82] the head is molded and burned. The shape of the inserts and the shape of the well in the head are such that it would be extremely difficult if not completely impossible to put the inserts in place after molding and burning of the head. But if the inserts are to be molded into the head when the head is formed the temperature to which the head is subjected in burning is so great that the inserts will be either melted or at least softened so that they will become deformed and not perform their intended function.

Furthermore, when the Bacon stopper is used for the pouring of steel the heat of the molten steel will either melt or deform the metal channel inserts 9 or cause them to weld to the pin 2. Bacon recites in his patent, page 1, lines 9 through 37, some major deficiencies of the bayonet joint type ladle stopper and his remarks are pertinent to the deficiencies of the Bacon ladle stopper and the superiority of applicant's ladle stopper. In spite of the incorporation of the channel inserts 9 into the Bacon ladle stopper it is still necessary that the assembly of the Bacon stopper head, plurality of sleeves and stopper rod be in a compressed or stressed state to have that assembly function properly in the steel pouring opera-

tion; thus mechanical stress concentration exists in stopper head 5 after assembly.

When molten steel surrounds Bacon's stopper head 5 the severe thermal stress induced will act on the zone of mechanical stress concentration in stopper head 5 and will be additive with the concentrated mechanical stress. In consequence vertical ruptures of stopper head 5 of Bacon occur generally along a plane containing the axis of the cross pin 2. Such ruptures may result in total failure of the stopper head or in localized erosion when only minor fissures occur. [83] This has been proved to be the case by actual tests made by a leading steel producer. The contrary is true in applicant's structure in which the stress concentration of Bacon does not exist.

Sears Patent No. 1,843,175

The Sears patent is in the same general category as the Bacon patent and the above statements relative to Bacon apply generally to Sears. Sears forthrightly admits that his plate 29 can only be embodied in the stopper head by being molded into the head when the head is formed. The plate is subject to the same defects and disadvantages during formation of the head and during the pouring of steel in a ladle in which the stopper is utilized as in the case of the channel inserts 9 of Bacon.

THE CLAIMS DISTINGUISH OVER THE REFERENCES BOTH IN TERMS AND IN SUBSTANCE

In the above discussion of the prior art patents relied upon by the examiner we have demonstrated how applicant's invention constitutes an improvement over the prior art. We shall now point out how applicant's claims distinguish in terms over the references.

Claim 2

Claim 2 clearly distinguishes from all three references by specifying "means separate from the head also inserted downwardly into the well above the lateral projection at the bottom of the rod into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well and connected with the head whereby to attach the rod to the head, said means being the sole means overlying the lateral projection at the [84] bottom of the rod." The means thus defined are applicant's lugged insert ring 9 of Figure 5 and applicant's threaded collar 9a of Figure 6. In the British patent the only means separate from the head other than the rod insertable downwardly into the well is the locking block B², but the locking block is neither "connected with the head whereby to attach the rod to the head" nor "the sole means overlying the lateral projection at the bottom of the rod" as required by the claim. The British patentee is completely dependent upon the flange F of the rod E being inserted into the undercut portion of the head to maintain the assembly. In applicant's structure no portion of the rod flange underlies any portion of the head. The result is an unprecedentedly strong yet low cost connection which has been widely adopted by the steel industry as pointed out above.

In neither Bacon nor Sears is there any means separate from the head inserted downwardly into the well above the lateral projection at the bottom of the rod as specified in claim 2. These structures are both straight bayonet type joints and in each case the flange or lateral projection at the bottom of the rod underlies a portion of the head to maintain the assembly of the rod and head.

Thus claim 2 clearly avoids all three references both in terms and in substance.

Claim 5

This claim is specific to the well of the head "having a portion of its wall relatively remote from its bottom of smaller transverse dimension than a portion of its wall less remote from its bottom, forming a shoulder facing [85] toward the bottom of the well," together with "a rod having a lateral projection at its bottom inserted downwardly into the well and means separate from the head inserted downwardly into the well upon insertion of the rod interposed between said shoulder and the lateral projection at the bottom of the rod blocking withdrawal of the rod from the well whereby to attach the rod to the head."

In the British patent the only member other than the rod insertable downwardly into the well is the locking block B² which is not interposed between any shoulder of the well facing toward the bottom of the well and the lateral projection at the bottom of the rod. Likewise the bayonet type structures of Bacon and Sears clearly do not respond to claim 5.

Claim 7

This claim is specific to "cooperating preformed elements fitting together to at least largely surround the rod above the lateral projection thereon applied to the head into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well whereby to attach the rod to the head." This claim is specific to the holding means comprising cooperating preformed ele-

ments fitting together to at least largely surround the rod. None of the references has anything of this sort and claim 7 is submitted to clearly distinguish therefrom.

Claim 9

This claim calls for the well as "having at a portion of its periphery a shoulder facing toward the bottom of [86] the well," together with "a rod having a lateral projection at its bottom inserted downwardly into the well and means separate from the head also inserted downwardly into the well into position to overlie at least a portion of the lateral projection at the bottom of the rod and turned to a position in which a part thereof underlies said [the downwardly facing] shoulder to block withdrawal of the rod from the well and thereby attach the rod to the head." What has been said above regarding the earlier claims also applies here. The only means separate from the head inserted downwardly into the well in any of the references is the locking block B² of the British patent but that block is not and cannot be turned to a position in which a part thereof underlies a shoulder of the well as the claim specifies.

Claim 12

This claim is specific to "means comprising a refractory head having a well extending downwardly thereinto having a downwardly facing shoulder and means separate from the head applied to the head and rod downwardly through said well into position to underlie at least a portion of said shoulder and overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well whereby to attach the rod to the head." The references

do not have any means as specified separate from the head applied to the head and the rod to underlie a portion of a shoulder in the head and overlie at least a portion of the lateral projection at the bottom of the rod.

[87]

Claim 13

Claim 13 is a sub-claim under claim 12 and contains all the limitations of claim 12 and is submitted to be allowable for the same reasons as above set forth in support of claim 12. In addition claim 13 specifies "means holding said head and said separate means against substantial relative movement to insure maintaining the rod attached to the head." The additional means of claim 13 are the locking member 14 shown in Figure 3 of the drawings of the application. In the British patents the locking block B² does not hold the head and any separate means against substantial relative movement.

SUMMARY

Summarizing, the invention of the present application has important advantages over the prior art and all of the claims clearly distinguish from the references both in terms and in substance. All of claims 2, 5, 7, 9, 12 and 13 are submitted to be allowable and applicant prays that the rejection of those claims be reversed and the application allowed.

Examiner's Answer

[88]

(Filed June 23, 1961)

This is an appeal from the final rejection of claims 2, 5, 7, 9, 13 and 12. Claims 1, 3, 4, 5, 10 and 11 are cancelled. Claim 8 is allowable.

A correct copy of the appealed claims appears at pages 1-3 of applicant's brief.

THE REFERENCES RELIED UPON

Bacon	1,719,795	July 2, 1929
Sears	1,843,175	Feb. 2, 1932
British Patent	12,291	A.D. May 31, 1904

The alleged invention is adequately described on pages 3-7 of applicant's brief.

THE REFERENCES*Bacon,*

The patent to Bacon shows and discloses a stopper rod assembly for a ladle comprising a refractory head (5) having a well extending downwardly thereinto, a rod (1) having a lateral projection (2) at its bottom [89] and means (9) separate from the said head and *adapted* to be inserted downwardly into the well and above the said lateral projection on the rod to thus prevent withdrawal of the rod and thereby to attach said rod to said head. It is noted that Bacon provides recessed portions (7) and slots (8) which forms a shoulder facing toward the bottom of the well and adapted to receive separate means (9) within the well. As applicant recognizes the "patent is silent or to whether the metal claimed inserts (9) are molded into the head 5 when the head is formed or whether the inserts are put in place

after the head is formed—" (See pages 11 and 12 of applicant's brief). As the instant claims are drawn to the structure of the stopper assembly it is the Examiner's position that the method of assembly the individual elements lends no patentable merit to the specific structure.

Sears,

The patent Sears shows and discloses a stopper assembly comprising a refractory head (20), having a well (27), a rod (33) having a lateral projection (34) at its bottom and means (29) separate from the head and adapted to be inserted downwardly into said well. The said means (29) fit within the well and under the shoulder portion of the head to thus secure the rod to the head by engaging the projection (34) of the rod within the recessed portion (31) of the means. It is the Examiner's [90] position as in the case of the Bacon device that the means (29) may be inserted into the well after the head is molded and need not be molded to the well as an integral unit. Note that "—plate 29 is loosely fitted within the chamber—" (See page 2, col. 1, lines 32-34).

British Patent,

The British Patent shows a stopper assembly comprising a refractory head (D) including a downwardly extending well portion (B), a rod E including a flange portion that extends downwardly into said well and under a shoulder formed within the well and means (B²) separate from the head *inserted* downwardly into the well and above the lateral projection of the rod to thus prevent withdrawal of the rod to thereby attach the rod to the head. It is noted that the wall defining the well has a portion remote from the bottom of the well of smaller transverse dimension thus providing a shoulder

which extends over the lateral projection of the rod when the latter is inserted into said well. Note the specific language of the patent wherein the locking block (B²) “—automatically locks the ladle rod—” within the well thus securing the rod to the head portion.

THE REJECTION

Claims 2, 5, 7, 9, 12 and 13 are rejected as unpatentable over the British patent, Bacon or Sears taken individually. The basis of the rejection being [91] that “The references respectively show the basic elements of a ladle stopper but more specifically show separate means (British at B², Bacon at 9, and Sears at 29) insertable downwardly into a well portion and adapted at *least* a portion of a projection at the bottom of the stopper rod” to thus secure the said rod to the head”. In each and every case the means cooperating with the projection over the stopper rod prevents upward movement of the said rod relative to the head. While applicant argues that the locking block (B²) of the British patent only acts to prevent lateral movement of the rod it is noted that the broad language of the claims merely require that the means “block withdrawal of the rod from the well”. The claims include the prevention of lateral movement as well as vertical movement and are not limited to any specific movement with respect to rod withdrawal. Notwithstanding the broad language in which the instant claims are couched, it is the Examiner's position that the block (B²) and the shoulder formed within act in a manner to prevent withdrawal of the rod from the refractory head of the stopper. When additional sleeves as shown by (4) and (21) of Bacon and Sears patent are placed upon the head portion as in the British patent locking block (B²) will be secured

against vertical movement when a withdrawal pressure is exerted upon the rod. Applicant's argument with respect to the means (B²) of the British patent being located at one side within the well cavity [92] is far more specific than the claims warrant for the claims merely recite "—means separate from the head—" and "—inserted downwardly into the well—". This broad language would include *any* material inserted into the well above the stopper rod flange regardless of shape or size.

Claim 7 recites "—cooperating preformed elements fitted together to at least largely surround the rod—". In the regard this Honorable Board's attention is directed to Figure 2 of the Bacon patent wherein solid portions between the grooves (8) define cooperating preformed elements fitted together to largely surround the said rod (1). There is no requirement in claim 7 that the said elements be separate from the head and to this extent the claim fails to patentably define over the Bacon patent (*supra*) which shows the recited elements as forming the well portion of the stopper.

Claim 13 is clearly indefinite as being dependent on a previously cancelled claim viz (claim 11).

In conclusion it is submitted that the claimed subject matter fails to patentably define over the art of record (*supra*) and thus an affirmance is respectfully sought.

Request for Reconsideration

[102] (Filed August 9, 1961)

* * * * *

We have received the official action dated July 17, 1961, refusing entry of the AMENDMENT UNDER RULE 116(b) filed July 29, 1961. We respectfully request reconsideration of the refusal to enter the AMENDMENT UNDER RULE 116(b) for the following stated reasons.

* * * * *

[104] However it clearly appears from the Examiner's Answer that the issue is as to the form of the claims and not as to whether the application contains inventive subject matter.

* * * * *

Reply Brief for Applicant

[111] (Filed November 6, 1961)

The Examiner's Answer dated June 23, 1961, made clear to us for the first time in the prosecution of the application that the rejections of the appealed claims were based on the ground that the Examiner did not believe that the claims distinguish *in terms* from the references rather than that the defined inventions were deemed not to involve *invention*.

The Examiner's action of October 26, 1960, indicated very clearly that the ground of rejection was *lack of invention*. That action concluded with the following statement:

"The affidavit of T. H. Harley submitted in conjunction with the proposed amendment of October 10, 1960 has been given careful consideration but is not deemed persuasive as to the ultimate issue of pat-

entability. Though applicant's affidavit purports to establish the commercial acceptability of the instant device it remains that such commercial success is mere evidence as to the ultimate issue of patentability. Many decisions support in varying terms the proposition that applicant must demonstrate that his device produces 'new and useful [112] results never before attained' (Blanchard v. Ooms 1946 C.D. 22; 62 U.S.P.Q. 314.) It is noted that the instant affidavit [the affidavit of T. H. Harley dated October 6, 1960] is deficient on the singularly important point of whether the applicant's device is superior to those disclosed in the art of record".

That the issue was then deemed by the Examiner to be one of inventiveness over the prior art could hardly be more clearly evidenced. Note that there was not the slightest indication that any claim was deemed not to distinguish in terms from the references.

After receipt of the Examiner's action of October 26, 1960, we filed a further affidavit of T. H. Harley dated December 1, 1960, and a petition for remand of the application to the Primary Examiner for consideration of such affidavit. The affidavit of December 1, 1960, was directed entirely to the question of the *inventiveness* of the applicant's invention over the references cited. It appeared to us that the Examiner was inviting such an affidavit by the last sentence of the action of October 26, 1960, which stated, "It is noted that the instant affidavit is deficient on the singularly important point of whether the applicant's device is superior to those disclosed in the art of record".

Although it was our understanding from the First Assistant Commissioner's order of December 9, 1960, that the application was being remanded to the Examiner for consideration of the affidavit of December 1,

1960, no communication was received from the Examiner as to that affidavit. We waited until close to the last day of the time for filing the brief [113] on behalf of the applicant and then prepared and filed a brief addressed primarily to the issue of inventiveness over the references. The brief was filed March 2, 1961.

On June 23, 1961, the Examiner's Answer was filed and, as stated at the outset of this reply brief, made clear to us for the first time that the rejections of the appealed claims were based on the ground that the Examiner did not believe that the claims distinguished in terms from the references rather than that the defined inventions were deemed not to involve invention.

In view of the Examiner's Answer of June 23, 1961, we filed on June 29, 1961, an Amendment Under Rule 116(b) seeking to amend the claims to obviate the presumed deficiencies in their form which seemed to us to be the basis for the Examiner's Answer. In the remarks of the Amendment Under Rule 116(b) we said, "The amendments were not earlier presented because we did not understand from the record prior to the appeal just how the Examiner construed the claims and references".

By an action dated July 17, 1961, the Examiner declined to enter the Amendment Under Rule 116(b) for the reasons that "The Examiner is of the opinion that the Examiner's position as to the claims was clear prior to the Examiner's Answer" and that "The amendment, 'if entered', would require further consideration and search by the Examiner".

[114] We filed on August 9, 1961, a Request for Reconsideration. On October 5, 1961, the Board of Appeals remanded the application to the Primary Examiner for consideration of the Request for Reconsideration.

On October 16, 1961, the Examiner's Answer on Remand was filed stating that "The amendment of June 29, 1961, has not been entered for the reasons set forth in the Office letter of July 17, 1961" and also stating, "It is also noted that there was no showing in the applicant's amendment under Rule 116(b) of why the amendments were not presented earlier as required by rule 116(b)."

Under the circumstances applicant is compelled to proceed with the appeal on the basis of the claims as originally appealed without the amendments proposed in the unentered Amendment Under Rule 116(b) filed June 29, 1961, which were proposed in direct response to the Examiner's Answer of June 23, 1961, which for the first time in the prosecution of the case made clear that the Examiner's position is founded upon alleged lack of sufficient *definition* of the invention over the references rather than upon any alleged lack of *invention*.

While we naturally would have preferred to go to the Board on the claims amended as proposed in the Amendment Under Rule 116(b) since we believe that those amendments would obviate completely the grounds for rejection of the claims as first understood from the Examiner's Answer of June 23, 1961, we are proceeding with the appeal on the basis that the claims [115] even without the proposed amendments properly distinguish from the references. However, we respectfully submit that since the Amendment Under Rule 116(b) was given careful consideration by the Examiner as stated in the Examiner's action of July 17, 1961, it is proper for the Board to consider that amendment and in its decision instruct the Examiner to enter it. We emphasize nevertheless that even without the entry of that amendment the appealed claims are presented as claims which are

patentable and distinguish over the references both in terms and in substance.

The Board's attention is respectfully drawn to the fact that purely through a clerical oversight claim 13 which is dependent upon canceled claim 11 was not re-typed in independent form at the time of appealing. This is purely a matter of form. Nevertheless, in the Examiner's Answer of June 23, 1961, the Examiner stated, "Claim 13 is clearly indefinite as being dependent on a previously canceled claim viz (claim 11)".

We cannot believe that the Board would refuse claim 13 to the applicant because of the oversight in not re-typing the claim in independent form at the time of appealing. One of the amendments proposed in the unentered Amendment Under Rule 116(b) was the rewriting of claim 13 in independent form as claim 14. Such proposed rewriting of the claim in independent form was not accomplished because the Amendment Under Rule 116(b) was refused entry. For the Board's convenience we set forth below claim 14 copied from the unentered Amendment Under [116] Rule 116(b) and which is exactly appealed claim 13 but rewritten in independent form:

14. Means for application to a ladle stopper rod having a lateral projection at its bottom to form a ladle stopper, said means comprising a refractory head having a well extending downwardly thereinto, means separate from the head applied to the head and rod downwardly through said well into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod upwardly out of the well whereby to attach the rod to the head and additional means holding the head and said first mentioned means against substantial relative movement to insure maintaining the rod attached to the head.

We shall now reply to the Examiner's Answer of June 23, 1961, and demonstrate that the claims even without the amendments of the unentered Amendment Under Rule 116(b) are patentable over the references.

Bacon Patent No. 1,719,795

The Examiner's position as to the Bacon patent is that Bacon's inserts 9 (see Figs. 3 and 4 of the reference) are "*adapted* to be inserted downwardly into the well and above the said lateral projection on the rod to thus prevent withdrawal of the rod and thereby to attach said rod to said head". The reference does not disclose or teach any such adaptability. The inserts 9 can only practicably be incorporated in Bacon's stopper head 5 by being molded into the head when the head is formed, with the deficiencies explained at length in paragraph 12 of the Harley affidavit of December 1, 1960.

Claim 2 is submitted to clearly distinguish from Bacon in specifying "means separate from the head also inserted [117] downwardly into the well above the lateral projection at the bottom of the rod into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well and connected with the head whereby to attach the rod to the head, said means being the sole means overlying the lateral projection at the bottom of the rod". Bacon's inserts 9 are not "inserted downwardly into the well above the lateral projection at the bottom of the rod".

Claim 5 distinguishes from Bacon in defining "means separate from the head inserted downwardly into the well upon insertion of the rod interposed between said shoulder and the lateral projection at the bottom of the

rod blocking withdrawal of the rod from the well whereby to attach the rod to the head". Bacon has no such means as his inserts 9 cannot be inserted downwardly into the well upon insertion of the rod.

Claim 7 distinguishes from Bacon in specifying "cooperating preformed elements fitting together to at least largely surround the rod above the lateral projection thereon applied to the head into position to overlies at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well whereby to attach the rod to the head". The Bacon patent completely lacks any cooperating preformed elements as distinctly specified in the claim.

[118] Attention is directed to the examiner's treatment of claim 7 at the middle of page 5 of the Examiner's Answer of June 23, 1961. He interprets the Bacon patent to have "cooperating preformed elements fitted together to at least largely surround the rod", construing the "solid portions between the grooves (8)" of Bacon as "cooperating preformed elements fitted together to largely surround" the rod. The reasoning supporting such construction of Bacon is:

"There is no requirement in claim 7 that the said elements be separate from the head and to this extent the claim fails to patentably define over the Bacon patent (*supra*) which shows the recited elements as forming the well portion of the stopper".

We proposed to amend claim 7 by insertion of the words "separately from the head" to obviate the rejection of that claim but the Examiner declined to enter the amendment. However, we submit that it is manifest from applicant's disclosure and teaching that the "cooperating preformed elements fitted together to at least largely

surround the rod" defined by claim 7 are separate elements and not portions of the head. In the first place, the "solid portions between the grooves 8" are not "fitted together". In the second place, the reading of the "cooperating preformed elements" as portions of the head violates the rule of double inclusion or double reading since the head itself is set forth at the beginning of the claim and the conjunctive word "and" is used in introducing the "cooperating preformed elements". Since the head has already been defined as an element of the combination the words "*and* [119] cooperating preformed elements" *must* mean elements other than the head; otherwise the same element of the structure would have to respond to two different elements recited in the claim. It is well settled that such construction of a claim is untenable.

Claim 9 distinguishes from Bacon in calling for "means separate from the head also inserted downwardly into the well into position to overlie at least a portion of the lateral projection at the bottom of the rod and turned to a position in which a part thereof underlies said shoulder to block withdrawal of the rod from the well and thereby attach the rod to the head." Our above comments regarding Bacon apply here; also the inserts 9 of Bacon are not capable of being turned to a position as defined in the claims.

Claim 12 distinguishes from Bacon in specifying "means separate from the head applied to the head and rod downwardly through said well into position to underlie at least a portion of said shoulder and overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the

well whereby to attach the rod to the head." Our above remarks also apply to this claim.

Appealed claim 13, rewritten above in independent form as claim 14, includes an element in addition to those of the preceding claims and which is completely lacking in Bacon, to-wit, "additional means holding the head and said separate (first mentioned) means against substantial relative movement [120] to insure maintaining the rod attached to the head." Such additional means may, for example, be the locking member or members 14 of applicant's structure. Bacon has nothing of the sort.

Further comments anent Bacon appear in the following section of this reply brief regarding the Sears reference, for the Examiner treats the Bacon and Sears patents similarly.

Sears Patent No. 1,843,175

The Examiner's position with respect to the Sears reference is contained in the sentence beginning in the last line of page 2 of the Examiner's Answer of June 23, 1961, as follows:

"It is the Examiner's position as in the case of the Bacon device that the means (29) may be inserted into the well after the head is molded and need not be molded to the well as an integral unit."

Applicant respectfully joins issue as to this holding by the Examiner which as the Examiner admits is the basis for his use of both Bacon and Sears as references against applicant's claims. It is the applicant's position that the Examiner is completely wrong in holding that Sears's means or plate 29 "may be inserted into the well after the head is molded and need not be molded to the well as an

integral unit." We quote directly from Sears's specification at page 2, lines 86-102:

"In the production of the needle tip; that is, that section containing the metallic plate, I mold the green clay about a core so as to form a rectangular opening leading from the chamber longitudinally through the top of [121] the section. I then place the metallic plate in position and surround it with a collar of combustible material such as cardboard. A cover of combustible material is then used to close the open end of the collar whereupon additional clay is then packed around the hollow core thus formed and molded into the proper shape. The clay is then placed in kilns and burned to the desired temperature which is sufficiently high to cause the cardboard core to be consumed, leaving only the metallic plate loosely fitted in the chamber".

The Board's attention is respectfully directed to the fact that Sears as well as Bacon is entirely dependent upon the presence in his head of the metal member which can only be placed there by being molded into the head as specifically described in the portion of the Sears specification quoted above. We submit that this completely refutes the Examiner's statement that Sears's plate 29 "may be inserted into the well after the head is molded and need not be molded to the well as an integral unit." Simple consideration of Sears's drawings demonstrates conclusively that there is no possible way of getting his plate 29 into the head after the head has been formed.

In connection with Sears as well as with Bacon we respectfully refer to page 6 of the Harley affidavit of December 1, 1960, beginning in line 3. Harley points out that if the inserts of Bacon — and the same applies to the plate of Sears — are to be molded into the head when the head is formed the temperature to which the head is subjected in burning is so great that the inserts will be

either melted or at least softened so that they will become deformed and not [122] perform their intended function. The remainder of this paragraph of the Harley affidavit while dealing particularly with Bacon applies with equal force to Sears. Harley states that when the Bacon stopper is used for the pouring of steel the heat of the molten steel either will melt or deform the metal channel inserts 9 — to which the plate 29 of Sears functionally corresponds — or will cause them to weld to the pin 2 — to which Sears's anchoring member 34 corresponds.

Harley points out another distinction over Bacon which also applies to Sears. He states, beginning at page 6, line 15, of the affidavit of December 1, 1960, that in spite of the incorporation of the channel inserts 9 into the Bacon ladle stopper it is still necessary that the assembly of the Bacon stopper head, plurality of sleeves and stopper rod be in a compressed or stressed state to have the assembly function properly in the steel pouring operation; thus mechanical stress concentration exists in the stopper head after assembly. Note that both Bacon and Sears show the plurality of sleeves and the nut to be tightened down thereupon; in Bacon the nut is designated 10 and in Sears the nut is designated 35. When molten steel surrounds the stopper head the severe thermal stress induced will act on the zone of mechanical stress concentration in the stopper head and will be additive with the concentrated mechanical stress. In consequence vertical ruptures of the stopper head of Bacon occur, and the same is true of Sears. In Bacon the ruptures occur generally along a plane containing the axis of the cross pin 2. In Sears they [123] occur at the relatively restricted areas of the recesses 31. Such rup-

tures may result in total failure of the stopper head or in localized erosion when only minor fissures occur. Harley states at the bottom of page 6 of the affidavit of December 1, 1960, that this has been proved to be the case by actual tests made by a leading steel producer. He further states that the contrary is true in applicant's structure in which the stress concentration of Bacon does not exist.

We also respectfully draw the Board's attention to the Harley affidavit of October 6, 1960, showing the impression which applicant's invention has made upon the steel industry of the world. We agree with the Examiner that commercial success is only evidence of invention and not necessarily conclusive proof, but we submit that in the present case it is extremely cogent evidence because the Bacon and Sears patents have both been available to the persons most highly skilled in the steel pouring art for about thirty years and neither of them taught those skilled persons applicant's solution to the problem. The law is too well settled to require citation of authority that when a long existing problem is finally solved the fact that the experts in the art who were seeking the solution for years failed to find it is evidence that the solution was not obvious.

The provision of the molded-in metal members of Bacon and Sears is the antithesis of applicant's invention and points away from, not toward, the solution to the problem.

[124] It is unnecessary to discuss the individual claims in connection with Sears since the distinctions in the claims over that reference are the same as in the case of the Bacon reference.

British Patent No. 12,291/1904

The Examiner's principal contention with respect to the British patent is that the locking block B² prevents withdrawal of the rod E from the well of the head D. The locking block B² of the British patent has one function only, to-wit, to prevent lateral shifting of the rod relative to the head. The block B² does *not* block withdrawal of the rod *from* the well. It only blocks lateral shifting of the rod *in* the well. The Examiner's position seems to be that when the rod of the British patent is shifted laterally the short distance permitted when the locking block B² is withdrawn, that is a "withdrawal of the rod from the well". We respectfully take issue with the Examiner on this point.

It is submitted to be perfectly clear from applicant's specification and drawings considered as a whole that what applicant means by "withdrawal of the rod from the well" is withdrawal of the rod upwardly *out* of the well, not lateral shifting of the rod *in* the well. We sought to amend applicant's claims to satisfy this position of the Examiner by changing "withdrawal of the rod from the well" to "withdrawal of the rod upwardly out of the well" but the Examiner declined to enter the amendment. However, we submit that even without the amendment the meaning of the words "withdrawal of the rod from the well" is crystal clear from applicant's [125] disclosure and does not mean lateral shifting of the rod *in* the well as in the British patent.

The Examiner is still wrong in his understanding of the operation of the structure of the British patent. The

Examiner incorrectly states near the bottom of page 4 of the Examiner's Answer of June 23, 1961:

"When additional sleeves as shown by (4) and (21) of Bacon and Sears patent are placed upon the head portion as in the British patent locking block (B²) will be secured against vertical movement when a withdrawal pressure is exerted upon the rod".

The Examiner overlooks the fact that the sleeves to which he refers are held down by a nut which is *threaded to the rod itself*. When the rod is pulled upwardly the nut moves upwardly with the rod and the sleeves likewise move upwardly with the rod as does also the locking block B². The locking block has no function whatever in holding the rod in place in the head. If the portion of the head at the right hand side of Fig. 5 of the British patent which overlies the right hand portion of the flange F of the rod E should crack, the rod, locking block, sleeves and nut would all move freely upwardly out of the head.

Thus the Examiner's understanding of the operation of the structure of the British patent is completely erroneous, and his construction of the words "withdrawal of the rod from the well" in applicant's claims is likewise completely erroneous and contrary to the plain teaching of applicant's specification.

We have previously pointed out in detail how each of applicant's claims distinguishes from the British patent. That [126] patent is submitted to be no reference at all against applicant's appealed claims.

SUMMARY

It is respectfully submitted that the applicant in this case is the victim of circumstances completely beyond his control. Originally the Examiner made it crystal clear by his statements quoted at the beginning of this reply brief that he regarded the issue as being one of *invention*. When the Harley affidavit of December 1, 1960, was filed that issue was apparently resolved and thereafter the Examiner switched his position completely; his present position as evidenced by the Examiner's Answer of June 23, 1961, is that the claims do not clearly distinguish in terms from the references. We sought to amend the claims to obviate any possible lack of clear definition over the references but the Examiner declined to enter the amendment. We have quoted above the reasons given by the Examiner for declining to enter the amendment and we respectfully submit that those reasons are not supported by the record. As to the Examiner's final holding that "there was no showing in the applicant's amendment under Rule 116(b) of why the amendments were not presented earlier as required by Rule 116(b)", we respectfully direct the Board's attention to the second sentence of the remarks of that amendment at page 2, lines 18-20, reading as follows:

"The amendments were not earlier presented because we did not understand from the record prior to the appeal just how the Examiner construed the claims and references".

[127] It is very clear from the remarks of that amendment taken as a whole that the reason why the amendments were not earlier presented was that up until that time we understood that the issue was not one of word-

ing of the claims but rather one of invention. The real issue became apparent to us for the first time upon reading the Examiner's Answer of June 23, 1961. That is what we meant by the explanation contained in the remarks of the unentered Amendment Under Rule 116(b).

Perhaps we were not as explicit as we should have been in explaining why the amendments were not earlier presented, but we submit that the applicant should not be penalized on such a purely technical ground. We submit that the Amendment Under Rule 116(b) should be entered and we ask that the Board in rendering its decision direct the entry of that amendment. However, we wish it clearly understood that it is the applicant's position that even if that amendment is not entered the claims when properly understood and construed against the background of the prior art distinguish over the references both in terms and in substance.

Reversal of the rejection of claims 2, 5, 7, 9, 12 and 13 (claim 13 being rewritten above in independent form as claim 14) is respectfully solicited.

Decision of Board of Appeals

[131] (Filed October 22, 1962)

Before McCANN, KREEK and M. F. BAILEY,
Examiners-in-Chief.

KREEK, Examiner-in-Chief.

This is an appeal from the final rejection of claims 2, 5, 7, 9, 12 and 13. Claim 8 has been allowed.

Claim 2 is illustrative:

2. A stopper for a ladle or similar receptacle comprising a refractory head having a well extending downwardly thereinto, a rod having a lateral projection at its bottom inserted downwardly into the well and means separate from the head also inserted downwardly into the well above the lateral projection at the bottom of the rod into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well and connected with the head whereby to attach the rod to the head, said means being the sole means overlying the lateral projection at the bottom of the rod.

[132] The references relied upon are:

Bacon	1,719,795	July 2, 1929
Sears	1,843,175	Feb. 2, 1932
British Patent	12,291	May 31, 1904

Appellant's device and those of the references are adequately described in appellant's brief and in the Examiner's Answer, respectively.

The claims have been rejected as unpatentable over the prior art as represented by the above cited references.

We have carefully considered the rejections in the light of appellant's arguments as presented in the briefs and at the oral argument, however, we are not convinced of reversible error in the rejection.

The plate 29 of Sears is for the purpose of distributing the stress, imposed by the connecting pin, over a greater area. This plate and its function could be eliminated without the exercise of invention. Likewise the metallic segments 9 of Bacon have been added to prior structures for the distribution of stresses. They could be eliminated without the exercise of invention.

In appellant's device such stresses as may exist between the locking flanges of the plug 9 and the head 3 are distributed only on the interengaging area, which, as far as the claims are concerned may be even a smaller area than presented by the interlocking members 34 of Sears or 2 of Bacon.

Claim 2 further differs from the explicit disclosure of Sears in the interrelationship of the rod 16 having a projection 17 and the means 9 separate from the head 5 and insertable downwardly into the well bore. [133] Within the terms of the claim this insertion could be simultaneously with the insertion of the rod. Even giving weight to the implied mode of assembly in a claim drawn to structure, we do not believe that these limitations patentably distinguish over Sears. This patent states that the tie rod 33 "carries at its lower end an anchoring member 34." Under this broad description, many ways of "carrying" the member 34 would at once become obvious to one skilled in the art among which would be to provide a head on rod 33, preferably a non-

circular head interengaging with a mating countersink in the member 34.

Therefore, we are of the opinion that claim 2 at best merely sets forth only an arbitrary modification of the Sears structure and/or a variation therefrom which would be obvious to one skilled in the art.

The locking pin 2 of Bacon could be secured to the rod 1 in a manner similar to Sears. In addition, this interrelationship of locking means and rod is so broadly set forth that claims 2 would read on Bacon if the rod thereof were of slightly larger diameter immediately below the pin 2. No advantage is seen in such an arbitrary variation.

Claims 5, 9 and 12 present no issues different than claim 2.

Claim 7 recites "preformed elements fitting together to at least largely surround the rod." The use of split bushings to facilitate assembly to a rod is a common mechanical expedient. The use thereof in the present surroundings for its usual purpose would be well within the expected skill of the art.

[134] Claim 13 which depends on rejected claim 11 has been rejected as indefinite. We have examined the claim in conjunction with claim 11 and are of the opinion that it is not patentable over the art of record. It differs from claims such as claim 2 by the recitation of means holding said head and said separate means against substantial relative movement. This broad limitation is met by the threaded means of Sears and Bacon which hold the stopper in assembled relation.

In our consideration, we have given careful attention to the affidavits of record but do not find them persuasive of patentability. They contain many statements of advantages of the instant device over the prior art, however, in many instances these advantages are based on structures not claimed.

Appellant has presented amendments to the claims which the Examiner has refused to enter, and urges us to consider them. We are an appellant tribunal and do not customarily consider amendments not previously considered by the Examiner. Amendments considered by the Examiner and refused entry are not before us.

The decision of the Examiner is affirmed.

AFFIRMED

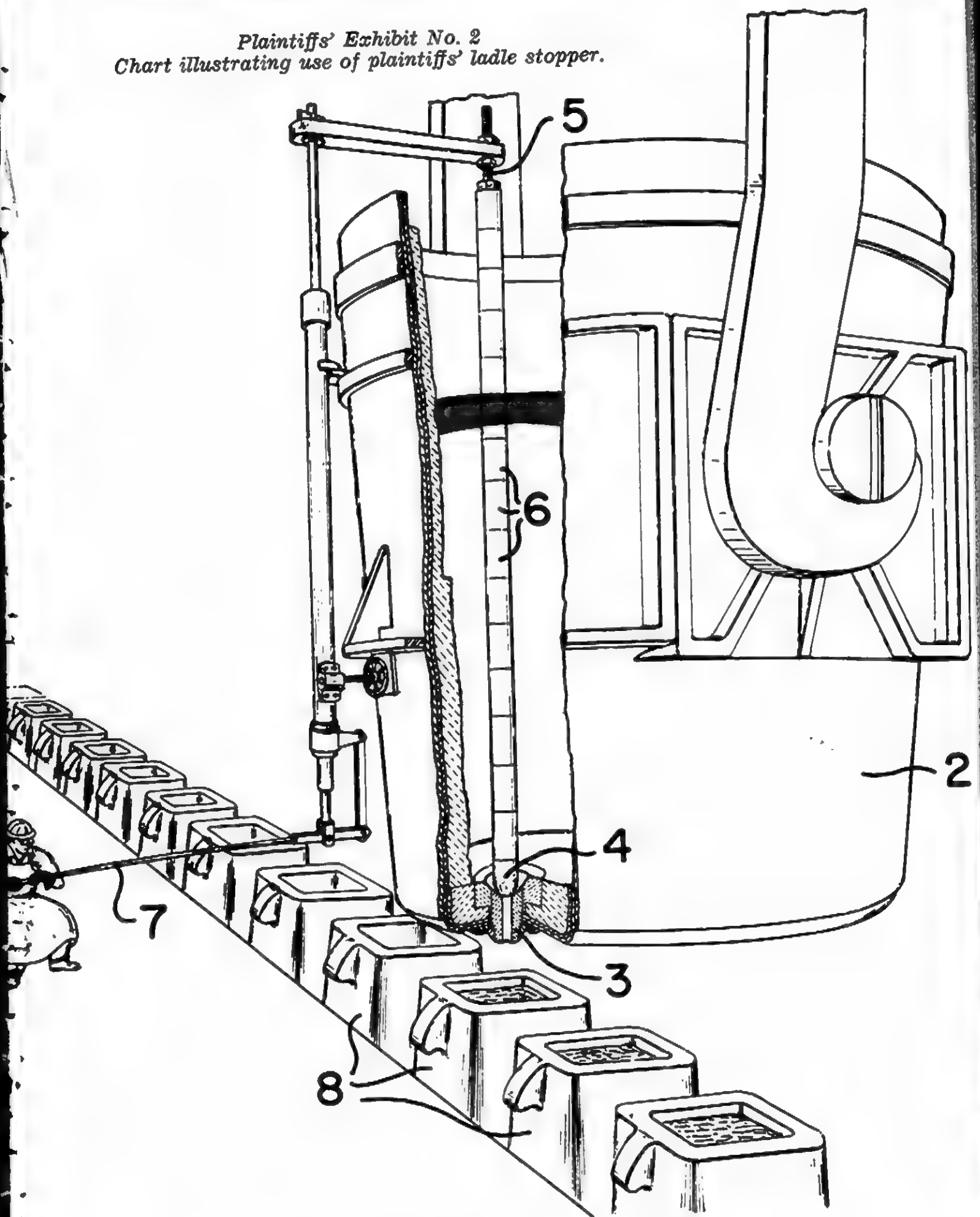
L. P. McCANN
Examiner-in-Chief

LOUIS F. KREEK
Examiner-in-Chief

M. F. BAILEY
Examiner-in-Chief

BOARD
OF
APPEALS

Plaintiffs' Exhibit No. 2
Chart illustrating use of plaintiffs' ladle stopper.



(Plaintiffs' Exhibit No. 7 is a
chart of the drawings of
the Sears Patent)

Fig. 1.

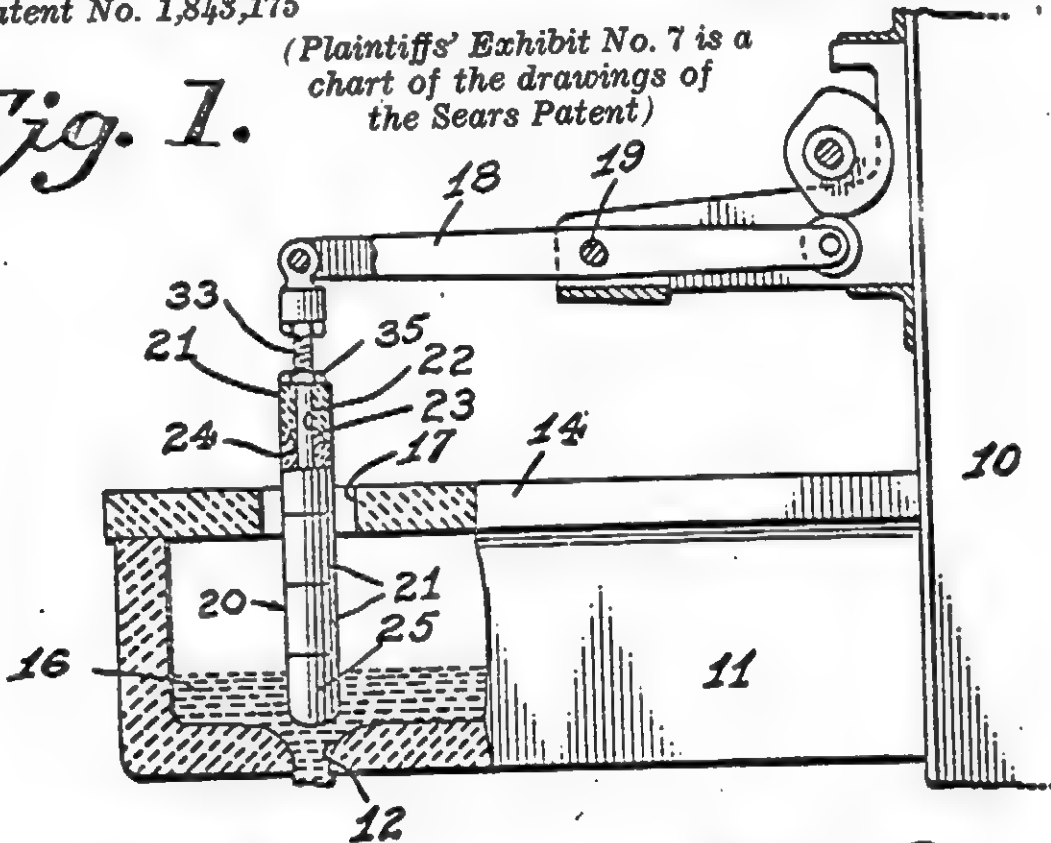


Fig. 2.

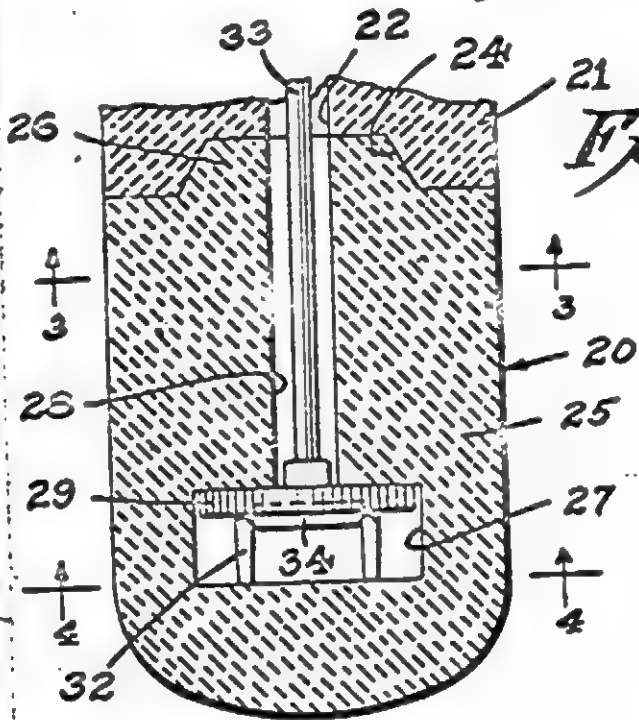


Fig. 3.

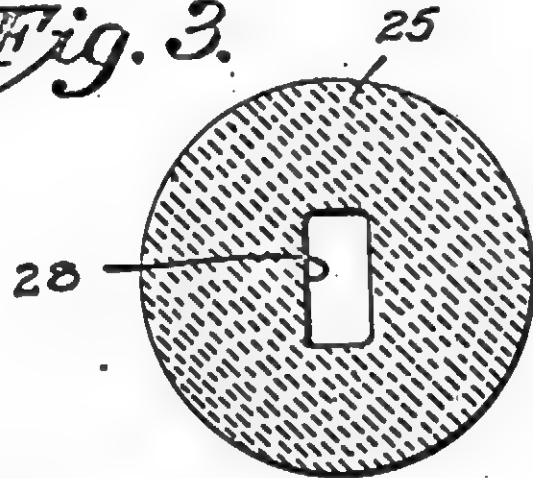


Fig. 4.

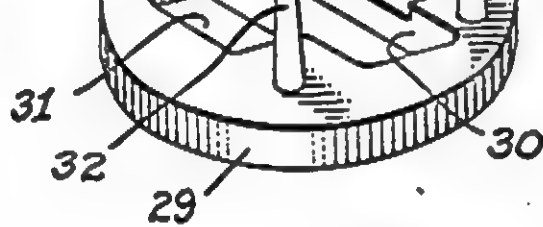
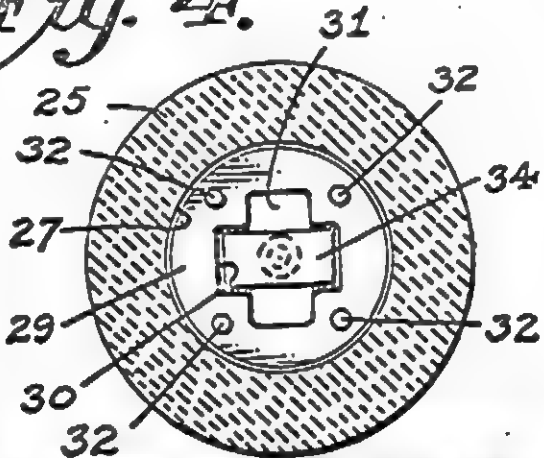
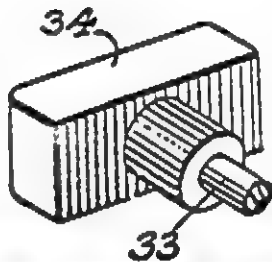


Fig. 5.

Fig. 6.



INVENTOR
David B. Sears
BY *Dmy Rely*
ATTORNEYS

UNITED STATES PATENT OFFICE

DAVID B. SEARS, OF CORNING, NEW YORK, ASSIGNOR TO CORNING GLASS WORKS, OF CORNING, NEW YORK, A CORPORATION OF NEW YORK

REFRACTORY ARTICLE

Application filed August 28, 1929. Serial No. 388,917.

This invention relates to improvements in refractory articles and more particularly to refractory needles such as are commonly employed in glass feeders.

5 Refractory needles to which this invention relates are suspended from one end of a rocking beam directly over the orifice of a forehearth and are alternately projected and retracted relative to the orifice so as to intermittently extrude a gob of molten glass. Inasmuch as the lower end of the needle is submerged in the molten glass and its upper end protrudes beyond the top of the forehearth, there is a wide difference in temperature between the two ends of the needle and hence, when such needles are formed in one piece, strain is created within them which causes breakage and necessitates frequent replacements. To overcome this, it has been the practice to build up the needles from a series of relatively short hollow cylindrical sections which are threaded on a metallic rod, the upper end of which is attached to the rocking beam while the lower end is threaded to receive a nut which forms a stop to prevent the sections from sliding off. In order to protect the lower end of the rod and the nut from the corrosive action of the glass and to protect the glass from contamination by the metal, it has been the practice to counter-sink the nut into the end of the lowermost cylindrical section and then pack the opening with clay. This has not always proven satisfactory owing to the fact that the texture of the packing rarely corresponds to that of the needle so that uneven expansion takes place and breakage is apt to occur. Moreover, the tight packing of the clay around the metal parts does not allow for expansion of the metal so that breakage is very apt to take place due to the differences in the expansion coefficients of the metallic and clay parts.

45 The object of the present invention is to prevent breakage of a built up refractory

needle which is caused by the expansion and contraction of the metallic parts.

Another object is to procure uniformity of the texture of the clay in the needle tip of a built up needle.

A further object is to completely enclose the metallic needle parts with a refractory of uniform texture so as to protect the glass from contamination through contact with them.

The above and other objects may be attained by the use of my invention which embodies among its features a needle tip having a chamber near its lower end in which an apertured plate is loosely fitted, said tip also having a longitudinal bore extending from the chamber through its upper end, a tie rod extending through the bore and anchoring means on the lower end of the rod for engaging the plate and anchoring the rod in the needle tip.

In the drawings:

Fig. 1 is a sectional view through a forehearth showing a needle suspended therein, the latter being constructed in accordance with this invention;

Fig. 2 is an enlarged fragmentary sectional view of the needle;

Fig. 3 is a transverse sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a transverse sectional view taken on the line 4—4 of Fig. 2;

Fig. 5 is a perspective view of the metallic plate used in the needle tip; and

Fig. 6 is a perspective view of the anchor and a fragment of the tie rod.

Referring to the drawings in detail, a glass melting furnace 10 is provided with the usual forehearth 11 having a glass discharge orifice 12. A cover block 14 rests upon the upper edges of the forehearth to confine the heat generated by fires playing over the surface of molten glass 16 and is provided with an opening 17 which aligns with the orifice 12. A rocking beam 18 is pivotally

supported at 19 above the forehearth and one end of this beam is connected for oscillating movement to the usual feeder mechanism (not shown), while its opposite end is disposed over the opening 17. A needle designated generally 20 is suspended from the end of the beam 18 opposite that which is connected to the feeder mechanism, and extends downwardly through the opening 17 into the forehearth, its lower end being submerged beneath the level of the glass 16.

In its present form the needle 20 consists of a plurality of cylindrical sections 21 which are provided with longitudinal bores 22. Each of these sections is formed at its upper end with a tapered boss 23 which is adapted to fit into the tapered recess 24 formed in the bottom of the next adjacent section. In this manner proper alignment of one section with the other to form a complete needle unit is preserved.

The lowermost needle section designated by the numeral 25, like the sections 21, is formed with an upwardly extending boss 26 which is fitted in the recess 24 of the section immediately above it, but instead of being provided throughout its length with a longitudinal opening, it is formed with a chamber 27 and a transversely rectangular longitudinal opening 28 which communicates with the chamber and extends through the upper end of the needle section. A plate 29 is loosely fitted within the chamber and is provided with a slot 30 which corresponds in size and shape to the cross section of the opening 28. The under side of the plate is provided with aligning recesses 31 which communicate with the slot and form a groove for the reception of the anchoring member to be more fully hereinafter described. The plate is provided with depending legs 32 which hold it in spaced relation to the bottom of the chamber. In order to hold the cylindrical sections in proper relation and provide an attached means by which the needle may be secured to the rocking beam, there is provided a metallic tie rod 33 which carries at its lower end an anchoring member 34.

In assembling the needle, the anchoring member 34 is introduced into the rectangular opening in the lowermost needle section 25, passed through the slot 30 and turned so that the shoulders on it engage in the recess 31. The other cylindrical sections are slipped over that portion of the tie rod which projects beyond the upper end of the tip section 25 so that their bosses 23 are received in the tapered recesses 24 until a needle of the desired length is produced. A nut 35 is then threaded onto the end of the tie rod, opposite that carrying the anchoring member 34, and clamps the sections together to form a complete needle. Obviously any number of refractory sections constructed as above de-

scribed may be assembled in the same needle by using tie rods of proper length.

In some cases it may be found desirable to use a needle having different characteristics at different places throughout its length, as for instance, a refractory which is highly resistant to corrosion, but heat conducting, may be used for the tip of the needle or that portion which is submerged in the molten glass, while a less corrosive resistant material, but one which may be less heat conducting, can be used for the part of the needle which is not submerged beneath the glass level. It immediately becomes apparent that any number of combinations may be employed in a single needle and, moreover, should breakage occur, only those sections of the needle which are broken need be removed and others may be readily substituted so as to effect economies in operation.

In the production of the needle tip; that is, that section containing the metallic plate, I mold the green clay about a core so as to form a rectangular opening leading from the chamber longitudinally through the top of the section. I then place the metallic plate in position and surround it with a collar of combustible material such as cardboard. A cover of combustible material is then used to close the open end of the collar whereupon additional clay is then packed around the hollow core thus formed and molded into the proper shape. The clay is then placed in kilns and burned to the desired temperature which is sufficiently high to cause the cardboard core to be consumed, leaving only the metallic plate loosely fitted in the chamber. It is obvious that other methods of forming the chamber and introducing the plate into it may be resorted to though I have found through experiment that the method described is satisfactory.

While in the foregoing there has been shown and described the preferred embodiment of my invention, it is to be understood that minor changes in the details of construction, combination and arrangement of parts may be resorted to without departing from the spirit and scope of my invention as claimed.

I claim:

1. A needle for glass feeders comprising a plurality of refractory sections, a tie rod extending through said sections, an anchor at one end of the tie rod, and means loosely fitted in one of the refractory sections for co-operation with the anchor in holding the sections on the tie rod.

2. A needle for glass feeders comprising a plurality of refractory sections, a tie rod extending through said sections, a metallic plate loosely fitted in one of said sections, and means on one end of the tie rod for engaging the plate and holding the sections in place.

3. A needle for glass feeders comprising a

plurality of refractory sections, a tie rod extending through said sections, an anchor at one end of the tie rod, one of the sections being formed with a chamber, and a slotted
5 plate loosely fitted in the chamber for engagement by the anchor whereby the sections are held against movement along the tie rod in one direction.

4. A needle tip including a refractory body
10 formed with a chamber and having an opening entering one end and communicating with the chamber, a slotted plate loosely fitted within the chamber, and means to maintain the plate adjacent to one end wall of the
15 chamber to facilitate the introduction of an anchoring member beneath the plate.

DAVID B. SEARS.

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Plaintiffs' Exhibit No. 8
Copy of Bacon United States Patent No. 1,719,795.
(Plaintiffs' Exhibit No. 9 is a chart
of the drawings of the Bacon patent.)
July 2, 1929.

C. C. BACON

1,719,795

BAYONET JOINT LADLE STOPPER

Filed Nov. 20, 1928

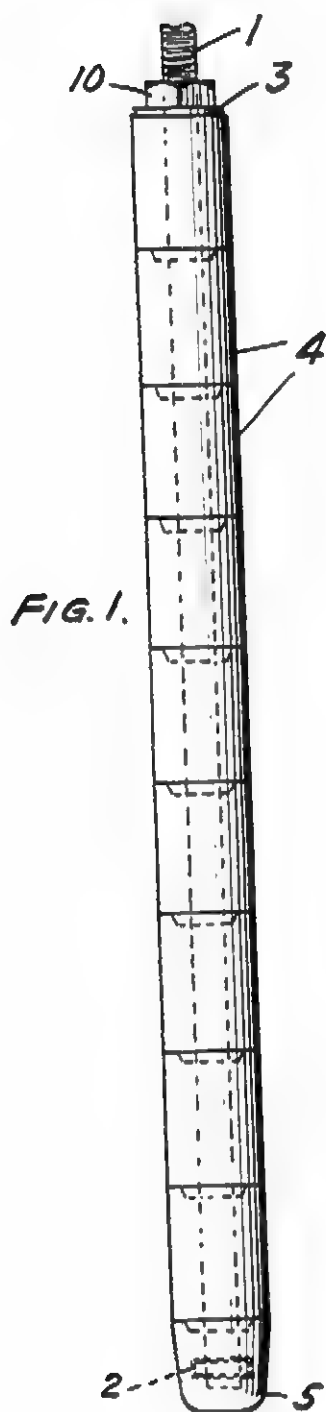


FIG. 1.

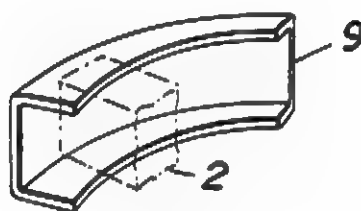


FIG. 4.

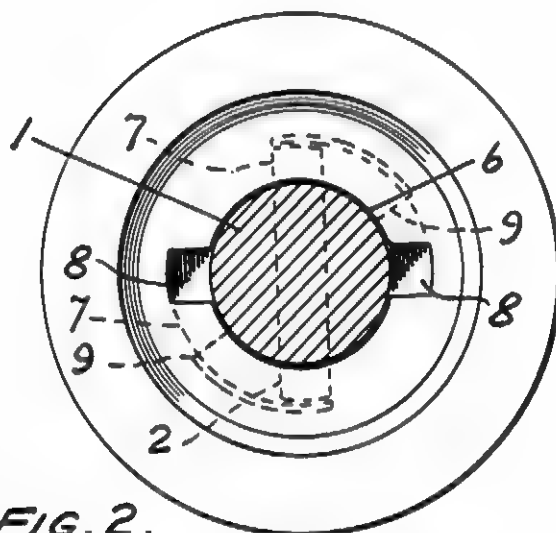


FIG. 2.

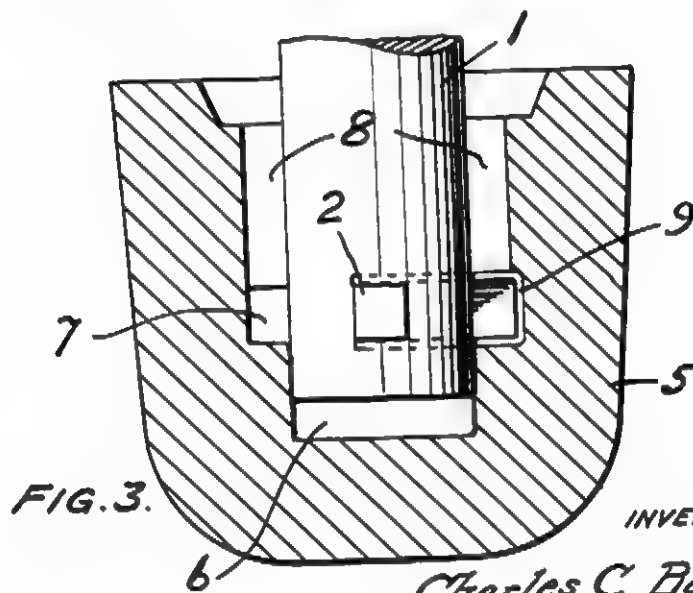


FIG. 3.

WITNESS:
Robert R. Hatchell.

INVENTOR
Charles C. Bacon
BY
Augustus B. Stoughton
ATTORNEY.

Patented July 2, 1929.

1,719,795

UNITED STATES PATENT OFFICE.

CHARLES C. BACON, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO ROSS-TACONY CRUCIBLE COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

BAYONET-JOINT LADLE STOPPER.

Application filed November 20, 1928. Serial No. 320,569.

The present invention is supplemental to that of my Patent No. 1,698,876 and, application #279,879 filed May 23, 1928, and covers another type of stopper head than either of them.

The invention relates to improvements in stoppers for bottom pour ladles used to contain molten metal.

The principal object of the present invention is to provide a stopper for use in controlling the flow of molten metal from a ladle which will not be damaged in fitting to the stopper rod or when unusual strain is put upon it.

Usually the closed end, bayonet joint ladle stopper is attached to the rod by turning it so that the transverse metal pin engages the horizontal slot in the stopper. The sleeves are adjusted on the rod with sufficient slurry between and held down firmly by fastening means at the upper end of the rod. The force exerted for adjusting the sleeves may draw the pin into the softer clay, or clay and graphite, of the stopper to the great danger of seriously damaging it with resultant failure during the pouring operation.

If a skull of chilled metal has formed in the metal in the ladle, the extra force required to release and lift the stopper may cause the metal pin to be drawn through the clay or clay and graphite above the slot, resulting in the loss of the stopper and thereby all control of the metal in the ladle.

When, as is sometimes necessary, (and frequently when not) the stopper is pounded down against the nozzle a similar shearing may result and the stopper head be lost.

My invention comprises the improvements to be presently described and finally claimed.

Figure 1 is a side elevation of the ladle stopper rod assembly.

Fig. 2 is a top elevation of the stopper head.

Fig. 3 is a vertical cross section through the stopper head, and

Fig. 4 is a detail of an insert channel.

Referring to Fig. 1 the ladle stopper rod assembly consists of a rod 1 having a pin 2 passing through the lower end thereof. At the upper end of rod 1 are mounted nut 10 and washer 3 which form a fastening means for a plurality of sleeves 4 which are mounted on and which surround rod 1. On the

lower end of rod 1 is mounted stopper head 5 which has hole 6 through the upper end thereof to admit rod 1. Partway of the axial length of hole 6 are horizontal grooves 7 into which are fitted channel inserts 9. The grooves 7 are shaped like segments of circles. On opposite sides of hole 6 are formed vertical slots 8 which give access each to one end of one of the grooves 7. Mounted in the opposite ends of grooves 7 from the slots 8 are channeled inserts 9 made of metallic or suitable material having a high melting point. The opening 6 is flared at its upper end to provide ready entrance to rod 1. Pin 2 descends through slots 8 and rod 1 is then rotated to cause pin 2 to rest against the ends of slots 7 in contact with channels 9. Thus it will be seen that channels 9, take the strain when rod 1 is moved in a vertical direction. This results in a much stronger stopper head.

It will be obvious to those skilled in the art to which the invention relates that modifications may be made in details of construction and arrangement, and in matters of mere form without departing from the spirit of the invention which is not limited as to such matters or otherwise than the prior art and the appended claims may require.

I claim:

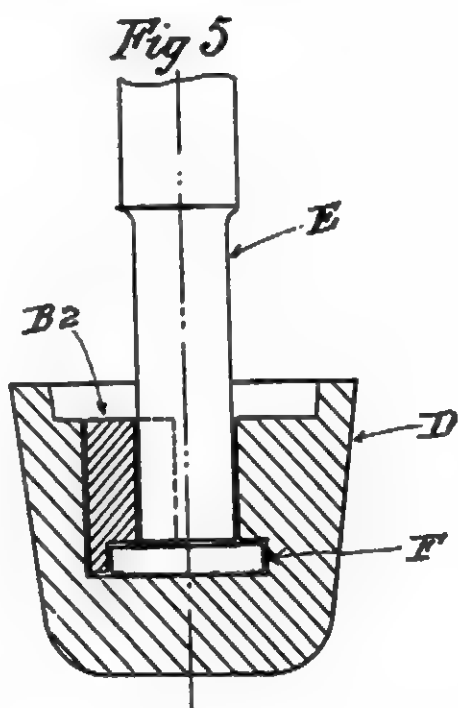
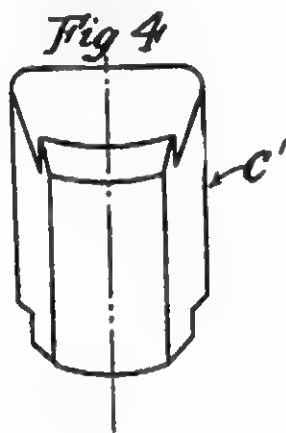
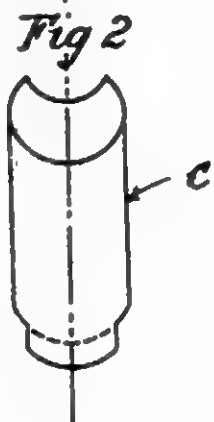
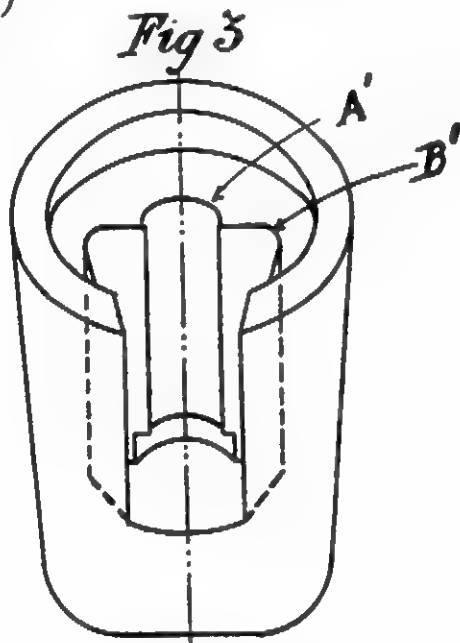
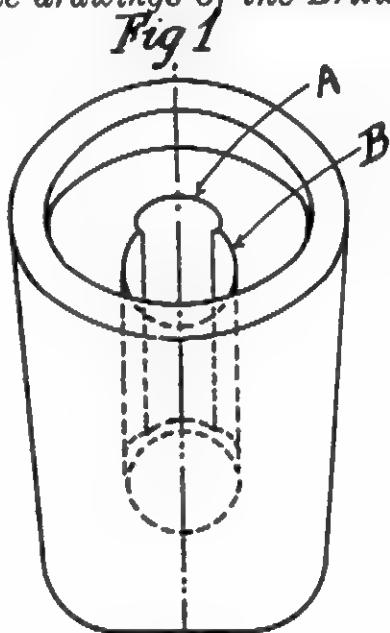
1. A ladle stopper head of refractory material provided with a closed end and having a recess and two channel members anchored in the recess substantially as and for the purposes described.

2. A ladle stopper rod assembly comprising in combination, a metallic rod, a pin through one end thereof, a stopper head of refractory material having bayonet slots therein adapted to receive the pin on said rod and channel members mounted at the inner ends of said bayonet slots.

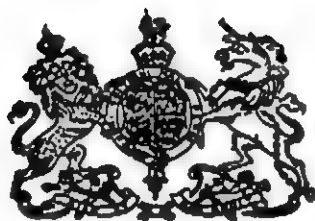
3. A ladle stopper head of refractory material having an axially arranged concavity provided with straight, confronting, axially disposed open slots and with opposed grooves circumferentially arranged, each of the form of a segment of a circle, and each connected at one end with one of said slots and each provided near its other end and as a continuation thereof with a ground insert of the form of a segment of a circle.

CHARLES C. BACON.

(Plaintiffs' Exhibit No. 11 is a chart of
the drawings of the British patent.)



[This Drawing is a reproduction of the Original on a reduced scale.]

N^o 12,291

A.D. 1904

Date of Application, 31st May, 1904

Complete Specification Left, 27th Feb., 1905—Accepted, 27th Apr., 1905

PROVISIONAL SPECIFICATION.

"A New, or Improved Ladle Stopper"

LUCAS WILLIAMS 19 Barratt St Stockton on Tees Works Manager—and THOMAS WILLIAMS "Gwalia" Seaton Carew Co. Durham Steel Works Manager do hereby declare the nature of this invention to be as follows:—

To obtain satisfactory results in the manufacture of steel by modern practice, a reliable stopper with the minimum of risks therewith, is of the utmost importance in teeming hot metal out of ladles into moulds; the object of this invention is to secure that end.

At present stoppers in general use have holes right through the centre, a connecting pin with a head on, is inserted partially through this hole, at the other or sleeve end, this connecting pin is then wedged on to the ladle rod, (in which a slot is made for that purpose) leaving a hole in the nozzle end, which has to be rammed or filled with ganister to protect the connecting pin head; or the ladle rod is wedged through the stopper horizontally, and both ends filled with ganister to protect the wedge.

By this invention, we use no ganister, wedge, or connecting pin, but secure the stopper to the ladle rod direct.

This we propose to do, by making the stopper in two sections; one section is so arranged and formed, that the ladle rod end, which has a head on it to support the stopper, is inserted vertically alongside the rod hole; (or, it may be arranged to insert it from the stopper side), it is then pushed horizontally into the recess of the rod hole, the head resting in a socket in the centre of the stopper; the other section forming a locking block, is slid down the ladle rod side and grips it in passing into its place, formed in the other section of the stopper, which it fits, and automatically locks the ladle rod therein.

This locking block may be dispensed with if desired, and the aperture filled with refractory material, when the ladle rod is "not" inserted from the side; when it is inserted from the stopper side, the locking block is made to taper from the centre; thus forming a block-ended stopper without the aid of wedges, connecting pin, or ganister; the ladle rod is then built up with sleeves in the ordinary way.

The stopper may be made of magnesite, clay, or any other suitable material.

Dated this 30th day of May 1904.

LUCAS WILLIAMS.
THOMAS WILLIAMS.

2

N^o 12,291.—A.D. 1904.*L. and T. Williams's New or Improved Ladle Stopper.*

COMPLETE SPECIFICATION.

"A New or Improved Ladle Stopper"

LUCAS WILLIAMS 19 Barratt St Stockton-on Tees Works Manager, and THOMAS WILLIAMS, The Cliff, Seaton Carew, Durham, "also of "Gwalia" Seaton Carew. Durham Steel Works Manager, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

To obtain satisfactory results in the manufacture of steel by modern practice, a reliable stopper with the minimum of risks therewith, is of the utmost importance in teeming the hot steel out of ladles into moulds, the object of this invention is to secure that end.

This we propose to do, by making the stopper in two sections, one section is so arranged and formed, that the ladle rod end (which has a head or collar on it) is inserted into the stopper vertically alongside the rod hole, (or, it may be arranged to be inserted from the stopper side,) it is then pushed horizontally into the recess of the rod hole, the head or collar resting in the socket or recess in the centre of the stopper; the other section forming a locking block is slid down the ladle rod side, and grips it in passing to its place, formed in the other section of the stopper, which it fits, and automatically locks the ladle rod therein; this form of locking block may be dispensed with if desired and the aperture filled with refractory material, then the stopper is made in one piece; but when the rod end is inserted from the stopper side, the locking block is made to taper from the centre, and is indispensable; thus forming a block-ended stopper, without the aid of wedges, tubes, connecting pins or ganister, as is now the general practice, the rod is then built up with sleeves in the ordinary way, the stopper may be made of magnesite, clay, or any other suitable refractory material.

Fig 1. A in the drawing is the rod hole, B rod head hole.

Fig 2. C is the locking block, (which may be dispensed with.)

Fig 3. A¹ is the rod hole B¹ is rod head hole. Fig 4. C¹ is tapered locking block, Fig 5. B² is locking block inserting rod head hole, D is vertical section of stopper through centre showing ladle rod with head or collar resting in recess in centre of stopper, E ladle rod, F ladle rod head or collar.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

A new or improved block-ended ladle stopper arranged and made so as to protect the ladle rod end from the hot steel, without the aid of wedges, tubes, connecting pins, or ganister.

Dated this 26th day of February 1905

LUCAS WILLIAMS.
THOS. WILLIAMS.

40

PLAINTIFFS' EXHIBIT NO. 14

Transcript of Sound Track of Motion Picture

This is the plaintiffs' stopper head with screw type insert. The insert contains an axial bore through which the stopper rod passes.

Here the insert is shown screwed into the stopper head.

This shows the lower end of the steel stopper rod which has an integral flange forged on it.

This is to show how the parts coact. The insert is introduced over the end of the stopper rod opposite the flanged end and is shifted along the rod until it bears against the flange.

This shows the workman applying the internally threaded stopper head to the end of the rod and the insert by turning the insert. This may also be done by holding the insert in a fixed position and turning the stopper head.

The insert is tightened in the stopper head. The insert bears upon the rod flange. Note that in this form the insert projects out of the head after the head is applied.

The first of a series of refractory sleeves for protecting the rod bears directly against the insert and is spaced from the head. Thus the head is not subjected to the thrust of the sleeves.

This shows the workman applying super duty high temperature refractory cement to the rod and to the insert. The refractory cement fills the cracks and spaces and provides a seal to prevent penetration of the molten steel.

The head is screwed onto the insert. High temperature cement has a high heat resisting effect and desirable cohesive properties to seal together the component parts. The insert bears on the rod flange and in this form projects above the head as has been shown in the earlier picture.

Here the workman applies high temperature cement to the gap between the head and the first sleeve. The sleeve bears on the insert, not on the head.

Further refractory sleeves are applied and cemented. Each sleeve has a male projection and seats in a female socket of the next sleeve. When all of the sleeves have been applied a washer and nut are applied to the end of the rod opposite the flanged end and a large hexagon nut is firmly tightened. The stopper assembly is thoroughly coated with refractory cement for added protection, particularly at the head and joints.

This shows the completed assembly of the ladle stopper. Each sleeve bears upon the sleeve below it, but the bottom sleeve bears on the insert which in turn bears on the rod flange. The stopper head is not subjected to the thrust of the sleeves. The importance of this will be shown later in the film.

This is the plaintiffs' lug type head and insert. It functions the same as the screw type except that the head is held in place by the lugs of the lug type insert instead of by screw threads.

The lug type insert is applied in the same manner as the screw type insert and bears against the rod flange. The flange and not the head supports the heavy burden of the stopper rod refractories.

The stopper head is applied and turned so that the lugs of the insert hold it in place. The insert differs from the screw threaded form in that the lug type insert when installed is flush with the top of the head and does not project above the head as the screw type does. However, it can be designed to project above the head if desired.

The bottom sleeve used with the lug type has a downward annular projection shown here which bears on the insert, freeing the head from the thrust of the sleeves.

The sleeve is shifted up to the head so that the projection on the sleeve bears on the insert. See the gap between the head and the sleeve. This is precisely the same function as is performed by the screw type insert.

The next scenes show the making of the ladle stopper assembly the same as previously shown with the screw type. The sleeves are tightened down by applying a nut to the end of the stopper rod opposite the flanged end. The high temperature cement fills the cracks and spaces and affords a seal. It has no compressive strength. The thrust of the sleeves is exerted on the insert and is transmitted through the insert to the rod flange. The head is free of thrust imposed by the sleeves. This is of paramount importance when the stopper is jammed down in the ladle nozzle to stop the flow of molten steel out of the ladle under the extremely severe thermal conditions existing. The high temperature of the molten steel sets up very high thermal stresses and softens the stopper head. This tends to structurally weaken the head. The stopper head is the element relied on to control the pouring of molten steel out of the ladle. If while it is subjected to the very severe thermal stresses imposed by the molten steel, which is at a temperature of

the order of 2900 degrees Fahrenheit, severe mechanical stresses are superimposed on the thermal stresses, the danger of cracking or breaking apart of the stopper head becomes acute. This acutely dangerous and unsafe situation is avoided by relieving the stopper head of the downward thrust of the sleeves when the stopper head is jammed down into the ladle nozzle.

This picture shows the stopper in place in a ladle ready for tapping of molten steel from an open hearth furnace into the ladle. The ladle is 16 feet high and has a capacity in excess of 1700 cubic feet. This is a close-up of the stopper head seated in the nozzle at the bottom of the ladle. The nozzle orifice is completely closed.

To begin the tap, an explosive charge opens the tap hole of the furnace and the molten steel begins to flow down the spout and into the ladle.

The next few scenes were taken during the tap and are for the purpose of illustrating the severe conditions to which the ladle stopper is subjected. At the beginning of the tap the stream of molten steel at a temperature of the order of 2900 degrees Fahrenheit impinges directly on the relatively cold ladle stopper, imposing terrific thermal stress on the ladle stopper. The tap lasts for about 10 to 15 minutes during which the temperature of the stopper head is drastically increased. At such high temperature the stopper head becomes susceptible to cracking and plastic deformation.

The portion of the rigging for raising and lowering the stopper which extends over the top of the ladle can be seen in some of these scenes.

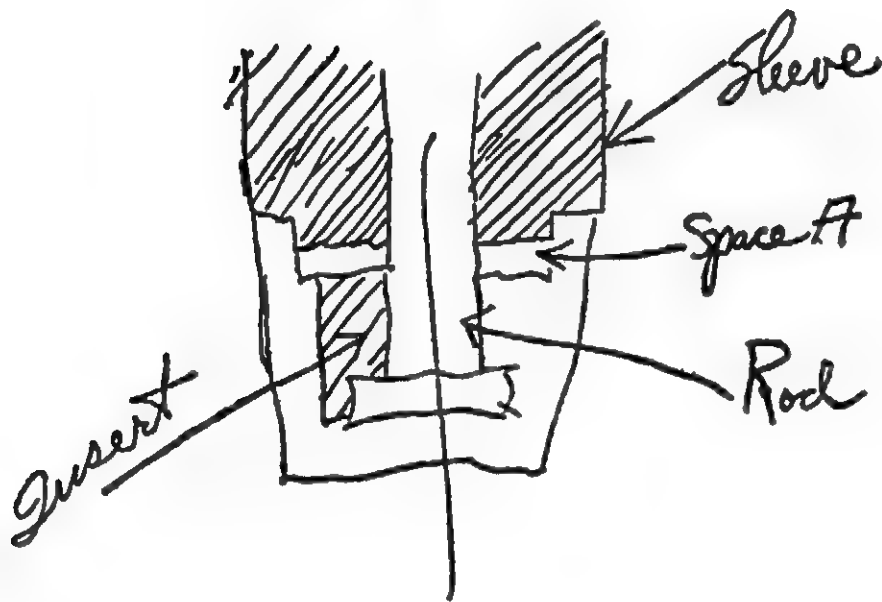
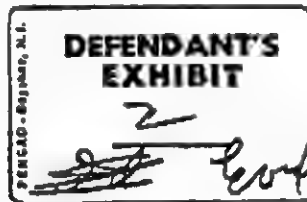
The additions being thrown into the ladle are alloys and deoxidizing ingredients. This ladle, certainly not the

largest of its kind, has a capacity of 1700 cubic feet and contains in excess of 700,000 pounds of liquid steel and 50,000 pounds of molten slag. The molten material overflowing the ladle is slag.

The ladle is picked up by an overhead crane and carried to a position in which the ladle nozzle is centered above the first of a long line of ingot molds.

These last scenes show the teeming of the molten steel into the ingot molds. When the workman lifts the lever the entire ladle stopper assembly in the ladle is raised to open the nozzle in the bottom of the ladle so that molten steel will flow down into an ingot mold. When an ingot mold is filled he jams the lever down and through the rigging the entire ladle stopper assembly is jammed down to position the stopper head in the nozzle and shapes the seat around the nozzle to form an effective seal. In many cases this is done 60 to 70 times before a ladle is emptied. If on each such violent thrusting of the superheated stopper head into the nozzle the thrust of the sleeves were imposed on the stopper head the danger of cracking of the stopper head would be great. That danger is obviated by the plaintiffs' stopper.

DEFENDANT'S EXHIBIT NO. 2



**Opinion of the United States District Court
For the District of Columbia**

(Filed June 25, 1964)

This civil action was brought pursuant to 35 U.S.C. 145 seeking judgment of this Court authorizing defendant, Commissioner of Patents, to issue Letters Patent of the United States containing claims 2, 5, 7, 9, 12, and 13¹ of an application Serial No. 759,670 entitled "Stopper for a Ladle or Simliar Receptacle" filed September 8, 1958, by plaintiff, Crawford B. Murton, and assigned to plaintiff, Vesuvius Crucible Company. Claim 8 was allowed.

The invention described in the application relates to an improvement in a stopper used to halt the flow of molten steel from an aperture in the bottom of a pouring ladle. The plaintiffs' device is comprised of four basic components. It has a long cylindrical steel rod with a flange at its bottom end, a refractory stopper head surrounding the flange with an aperture at its center within which the flange is positioned, a refractory insert which rests upon the upper face of the flanged bottom of the rod and prevents the rod from being withdrawn from the stopper head, and a column of refractory sleeves surrounding the rod and extending above the stopper head to protect the rod from the heat of the molten steel.

The claims read as follows:

2. A stopper for a ladle or similar receptacle comprising a refractory head having a well extending downwardly thereinto, a rod having a lateral projection at its bottom inserted down-

1. Claim 13 was presented through inadvertence to the Examiner in a form dependent upon Claim 11, which previously had been cancelled. The parties, by stipulation, agreed to present Claim 13 in independent form for adjudication.

wardly into the well and means separate from the head also inserted downwardly into the well above the lateral projection at the bottom of the rod into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well and connected with the head whereby to attach the rod to the head, said means being the sole means overlying the lateral projection at the bottom of the rod.

5. A stopper for a ladle or similar receptacle comprising a refractory head having a well extending downwardly thereinto, the well having a portion of its wall relatively remote from its bottom of smaller transverse dimension than a portion of its wall less remote from its bottom, forming a shoulder facing toward the bottom of the well, a rod having a lateral projection at its bottom inserted downwardly into the well and means separate from the head inserted downwardly into the well upon insertion of the rod interposed between said shoulder and the lateral projection at the bottom of the rod blocking withdrawal of the rod from the well whereby to attach the rod to the head.
7. A stopper for a ladle or similar receptacle comprising a refractory head having a well extending downwardly thereinto, a rod having a lateral projection at its bottom inserted downwardly into the well and cooperating preformed elements fitting together to at least largely surround the rod above the lateral projection thereon applied to the head into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well whereby to attach the rod to the head.
9. A stopper for a ladle or similar receptacle comprising a refractory head having a well extending downwardly thereinto, the well having at a portion of its periphery a shoulder facing

toward the bottom of the well, a rod having a lateral projection at its bottom inserted downwardly into the well and means separate from the head also inserted downwardly into the well into position to overlie at least a portion of the lateral projection at the bottom of the rod and turned to a position in which a part thereof underlies said shoulder to block withdrawal of the rod from the well and thereby attach the rod to the head.

12. Means for application to a ladle stopper rod having a lateral projection at its bottom to form a ladle stopper, said means comprising a refractory head having a well extending downwardly thereinto having a downwardly facing shoulder and means separate from the head applied to the head and rod downwardly through said well into position to underlie at least a portion of said shoulder and overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well whereby to attach the rod to the head.
13. Means for application to a ladle stopper rod having a lateral projection at its bottom to form a ladle stopper, said means comprising a refractory head having a well extending downwardly thereinto, means separate from the head applied to the head and rod downwardly through said well into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod upwardly out of the well whereby to attach the rod to the head and additional means holding the head and said first mentioned means against substantial relative movement to insure maintaining the rod attached to the head.

The Examiner in the Patent Office rejected the claims at issue as not patentable over any one of three cited references, taken individually. The references are a United States patent to Sears, No. 1,843,175, a United

States patent to Bacon, No. 1,719,795, and a British patent to Williams, No. 12,291 (1904). The Examiner does not state whether his rejection is based upon 35 U.S.C. 102, or upon 35 U.S.C. 103.

The British patent to Williams discloses a ladle stopper in which the refractory head has an irregularly shaped eccentric well (aperture) with a horizontal shoulder above an enlarged lower portion on the side nearest the head axis. The stopper rod has a concentric circular end flange of such diameter that the rod and flange can be inserted downwardly into the well and then shifted laterally to locate part of the flange under the shoulder. An insert filling the remainder of the well is then inserted to lock the flange in position under the shoulder. Alternatively, the locking block may be dispensed with and its space filled with cemented refractory material, making in effect a one-piece refractory stopper head of the type admitted by plaintiffs to be old in the art.

The Bacon patent discloses a bayonet-joint headed ladle stopper consisting of a rod having diametrically opposite projections near its lower end, a refractory head, and a column of refractory sleeves surrounding the rod and bearing upon the head. The refractory head has an aperture (well) in its center with metal channel inserts located within cavities in the aperture's walls. The diametrically opposite projections of the stopper rod fit into the cavities so the rod and its projection can be inserted downwardly into the aperture and then rotated to position the projections in the channel inserts and lock the head to the rod.

The Sears patent discloses a refractory head having an aperture (well) in its center with a lower cylindrical

portion of relatively large diameter and an upper portion of rectangular cross-section. The large dimension of the rectangular cross-section is smaller than the diameter of the lower portion. The stopper rod at its lower end has a rectangular flange which fits quite closely in the upper rectangular portion of the aperture but passes downwardly therethrough. During the molding of the head, a round, table-like, 4-legged structure is located within the lower cylindrical portion of the well. That structure has a circular flat top which contains a rectangular opening for receiving the rectangular stopper rod flange. On the lower side of the flat top there are shallow rectangular recesses located centrally along the sides of the rectangular opening so the rectangular rod flange, after it has passed through the opening, can be turned 90° and locked in those recesses. The patent also discloses a column of refractory sleeves above the stopper head and surrounding the rod.

The Examiner, in his Answer, listed each of the elements shown by the references that he felt were patentably equivalent to the elements claimed by the plaintiffs. He described the reference to Bacon as follows:

"The patent to Bacon shows and discloses a stopper rod assembly for a ladle comprising a refractory head (5) having a well extending downwardly thereinto, a rod (1) having a lateral projection (2) at its bottom and means (9) separate from the said head and *adapted* to be inserted downwardly into the well and above the said lateral projection on the rod to thus prevent withdrawal of the rod and thereby to attach said rod to said head. It is noted that Bacon provides recessed portions (7) and slots (8) which forms a shoulder facing toward the bottom of the well and adapted to receive separate means (9) within the well."

A similar treatment was accorded the patents to Sears and Williams:

"The patent to Sears shows and discloses a stopper assembly comprising a refractory head (20), having a well (27), a rod (33) having a lateral projection (34) at its bottom and means (29) separate from the head and adapted to be inserted downwardly into said well. The said means (29) fit within the well and under the shoulder portion of the head to thus secure the rod to the head by engaging the projection (34) of the rod within the recessed portion (31) of the means."

"The British Patent shows a stopper assembly comprising a refractory head (D) including a downwardly extending well portion (B), a rod E including a flange portion that extends downwardly into said well and under a shoulder formed within the well and means (B²) separate from the head *inserted* downwardly into the well and above the lateral projection of the rod to thus prevent withdrawal of the rod to thereby attach the rod to the head. It is noted that the wall defining the well has a portion remote from the bottom of the well of smaller transverse dimension, thus providing a shoulder which extends over the lateral projection of the rod when the latter is inserted into said well. Note the specific language of the patent wherein the locking block (B²) '— automatically locks the ladle rod —' within the well thus securing the rod to the head portion."

The Board of Appeals did not take the same approach as did the Examiner. The Board, when applying the references to the claims, suggested that plate 29 of Sears could be removed from his device without the exercise of invention, and likewise suggested that the metallic segments 9 of Bacon could be entirely eliminated from Bacon's disclosure. The Board further stated that the member 34 of Sears could be connected to Sears' tie rod

33 by means of a mating counter-sink arrangement, and that the locking pin 2 of Bacon could be secured to Bacon's rod 1 in a manner similar to that shown by Sears. All these modifications in the references, the Board held, would be within the skill of persons ordinarily skilled in the art.

The Patent Office, in its brief before the Court, does not appear to rely upon either the theory propounded by the Examiner or the different theory propounded by the Board. Instead, the Patent Office, before the Court, has directed its efforts to showing the claims at issue are so broad as to violate the requirements of 35 U.S.C. 112.

The Court must admit that it is somewhat disappointed by the divergence of approach manifested by the Patent Office in this case. It is confronted with the problem of selecting one, or indeed none, of three disparate propositions. Whether the "presumption of correctness" normally accorded to Patent Office adjudications² is wholly rebutted by such circumstances, the Court does not decide. It should be obvious, however, that it is at least severely weakened.

The plaintiffs relied before the Court and in their brief primarily upon a superior function of their device. Considerable testimony and argument was devoted to showing the advantage of having the refractory sleeves (which are positioned above the stopper head) bear on the surface of the insert rather than the surface of the stopper head. The advantage accruing from such a construction was said to be the removal of stress from the narrow side walls of the stopper head, thus reducing the

2. *Eссо Standard Oil Company v. Sun Oil Company*, 97 U.S.App. D.C. 154, 229 F.2d 37, 41-42 (1956), *Abbot et al. v. Coe*, 71 U.S.App.D.C. 195, 197-198, 109 F.2d 449, 451-452 (1939).

likelihood of failure of the stopper head during its performance.

This advantageous construction, however, does not appear to be directly set forth in the specification, and is certainly not recited by the claims. In view of this, the extensive arguments on this point may only be accorded slight probative weight.

The Court, after thoroughly reviewing all three different contentions of the Patent Office, has determined that the analysis by the Examiner in his Answer was correct.

As the Examiner stated, each element claimed by the plaintiffs appears to be present in the reference to Sears, and also in the reference to Bacon. The plaintiffs strenuously argued that the plate 29 of Sears is not "inserted downwardly into the well" as required by the claims. They recognize, however, that the Bacon patent "is silent as to whether the metal . . . inserts (9) are molded into the head (5) when the head is formed, or whether the inserts are put in place after the head is formed . . ."

The Court agrees with the Examiner's position that since the claims are limited to the *structure* of the stopper head assembly, the manner in which the parts are put together is not of great patentable significance. Insofar, however, as a "means plus function" recitation does define structural characteristics of the device's components, such functional recitations must be given effect. In this instance, however, the functional recitations do not seem comprehensive enough to distinguish structurally from the references in a manner unobvious to persons having ordinary skill in the art. It appears

to the Court that either the plate (29) or the opening (28) in Sears could easily be fashioned, if it were desired to do so, so that the plate could be inserted downwardly through the opening into the well. To merely do this would not appear to rise to the level of invention. In any event, it is admitted that the elements 9 of Bacon can be inserted downwardly through the well opening and into position above the upper face of the protuberance (2) at the bottom of the rod. This seems sufficient to meet the broad requirements of the claims.

An additional assertion by the plaintiffs was that their feature of making the insertion out of "preformed elements fitting together to at least largely surround the rod" patentably distinguishes from the references. The Court agrees with the Board, however, in its holding that "the use of split bushings to facilitate the assembly to a rod is a common mechanical expedient".

The British reference to Williams was used by the Examiner to meet some of the broader of the plaintiffs' claims. The Court generally agrees with this interpretation of the British patent. It does seem, however, that this reference might be avoided with respect to Claim 2 by that claim's requirement that the insert be the "sole means overlying the lateral projection at the bottom of the rod".

Finally, the plaintiffs rely upon proof of commercial success to show unobviousness. The Court is not convinced, however, that the commercial success the plaintiffs have enjoyed can be attributed to the claims before the Court. The feature which has produced the commercial success is apparently the manner in which refractory sleeves rest upon the stopper head assembly. Since the claims do not require that the sleeves rest upon

the insert, the commercial success arising from such a construction cannot be given weight in determining obviousness. In any event, commercial success is persuasive of unobviousness only in instances where that question is otherwise in doubt. *Union Metal Mfg. Co., et al. v. Ooms*, 81 U.S. App. D.C. 76, 154 F.2d 857 (1946). The Court here considers the references to so clearly teach all material aspects of the subject matter claimed that obviousness cannot be said to be otherwise in doubt.

After considering the record in the Patent Office, the proceedings at trial, and the briefs of the parties, it is the opinion of the Court that the totality of the evidence requires a finding for the defendant and against the plaintiffs. The Complaint, accordingly, will be dismissed.

The above Opinion contains Findings of Fact and Conclusions of Law.

DATED: June 25, 1964.

JOSEPH R. JACKSON

United States District Judge

**Order of the United States District Court
For the District of Columbia**

(Filed June 25, 1964)

This cause having come on for trial on December 18, 1963, and the Court having considered the record herein as well as the briefs the Court accorded the parties an opportunity to file, it is this 25th day of June, 1964,

ORDERED, that judgment be, and hereby is, entered for the defendant and against the plaintiffs, and that the Complaint be, and hereby is, dismissed, and that all costs of this proceeding be assessed against the plaintiffs.

JOSEPH R. JACKSON
United States District Judge

A TRUE COPY

TEST:

HARRY M. HULL, Clerk

By ELIZABETH WITMAN
Deputy Clerk

**Petition by Plaintiffs for Reconsideration
as to Claim 2**

Although this pleading is designated a Petition for Reconsideration, which it in fact is, it is technically a Motion for a New Trial under Civil Rule 59(a) (2) on which "the court may open the judgment if one has been entered, take additional testimony, amend findings of fact and conclusions of law or make new findings and conclusions, and direct the entry of a new judgment", and is intended to be so regarded. The relief sought is the making of new findings and conclusions and the directing of the entry of a new judgment.

Plaintiffs respectfully petition the Court for reconsideration of the Court's opinion and order filed June 25, 1964, as to claim 2 of the Murton patent application Serial No. 759,670 in issue. Plaintiffs hereby withdraw their complaint as to all claims except claim 2.

CLAIM 2

For convenience claim 2 is here copied:

2. A stopper for a ladle or similar receptacle comprising a refractory head having a well extending downwardly therein, a rod having a lateral projection at its bottom inserted downwardly into the well and means separate from the head also inserted downwardly into the well above the lateral projection at the bottom of the rod into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well and connected with the head whereby to attach the rod to the head, said means being the sole means overlying the lateral projection at the bottom of the rod.

CLAIM 2 CONTAINS THE CRITICAL LIMITATION THAT THE INSERT MEANS ARE THE "SOLE MEANS OVERLYING THE LATERAL PROJECTION AT THE BOTTOM OF THE ROD"

The Court held (Opinion, p. 8) that the British patent "might be avoided with respect to Claim 2 by that claim's requirement that the insert be the 'sole means overlying the lateral projection at the bottom of the rod'."

The Court did not discuss claim 2 in relation to Bacon and Sears. The same limitation—that the insert is the "sole means overlying the lateral projection at the bottom of the rod"—which distinguishes from the British patent *also distinguishes from Bacon and Sears.*

We here reproduce Figure 2 of Bacon in which the cross pin 2 must be read as the lateral projection at the bottom of the rod and the channel inserts 9 must be read as the insert means.

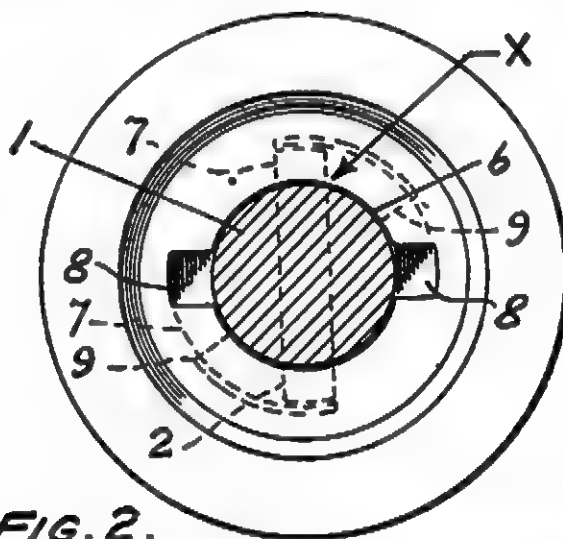
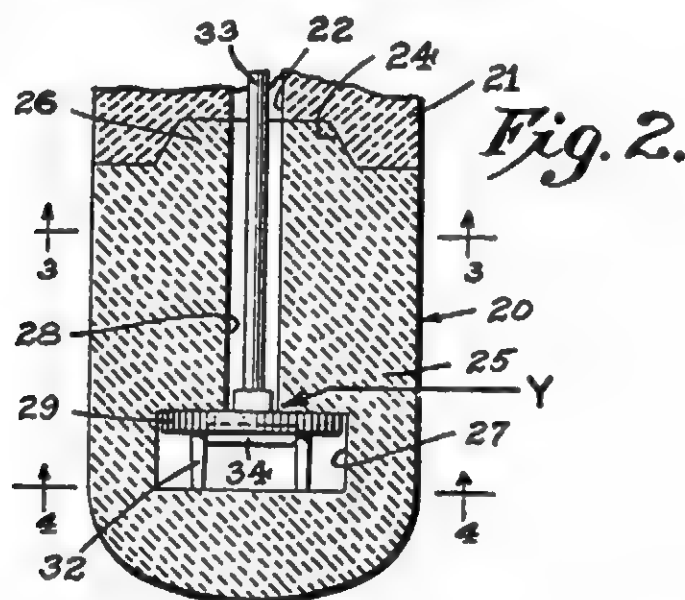


FIG. 2.

The body of the stopper head at X overlies the cross pin 2.

We here reproduce Figure 2 of Sears in which the anchoring member 34 must be read as the lateral projection at the bottom of the rod and the plate 29 must be read as the insert means. The body of the stopper head at Y overlies the anchoring member 34.



Thus claim 2 clearly distinguishes in terms from all of the references for the reason stated by the Court respecting the British patent.

THE SIGNIFICANCE OF THE LIMITATION

Referring to the three references, Sergy, plaintiffs' expert witness, testified (R. 65-66) :

"Every time the stopper is jammed down into the nozzle the inertia of the sleeves causes a mass or weight to come to bear on the sleeves which then bears on the head which then subjects the head to acute possibility of failure. The head stops at the nozzle on the downward thrust. The sleeves continue to apply a thrust down onto the head. This is at a time when the head is most vulnerable to receive that thrust."

Head failure results in danger to workmen, destruction of equipment and heavy financial loss—\$5,000 to \$10,000 for each head failure (R. 66-67).

Sergy testified (R. 67-69):

"Murton differs from the references cited, and he differs in an important and very critical manner. Murton's stopper head has a separate insert. This insert is applied or inserted into the stopper head overlying the rod flange and is connected to the head. When the rod is raised the head is raised. The weight of the sleeves cannot be carried by the head. The weight of the sleeves is carried by the insert, and the thrust of the sleeves is transmitted through the insert to the rod flange. It frees the head of any such stress and there is less danger of head failure.

* * * * *

"The experience with the Murton stoppers has resulted in a decrease in the head failures. The experience with respect to failures with the other stoppers amounted to about 10 percent. Failures with the Murton stopper head have been less than 3 percent."

The characteristic of Murton's ladle stopper that the insert is the "sole means overlying the lateral projection at the bottom of the rod" *is responsible for Murton's improved results. It enables the insert to seat on the rod flange and the sleeves to seat on the insert.* Sergy stated (PX 14, p. 4):

"The thrust of the sleeves is exerted on the insert and is transmitted through the insert to the rod flange. The head is free of thrust imposed by the sleeves. This is of paramount importance when the stopper is jammed down in the ladle nozzle to stop the flow of molten steel out of the ladle under the extremely severe thermal conditions existing."

Sergy further stated (R. 85) :

"Murton's insert has no equivalent in the references cited, and it makes possible the relieving of the stress imposed by the sleeves. It makes possible the use of an insert which transmits this thrust downwardly to a flange on the rod, thereby freeing the head of any thrust and thereby greatly improving the chances of not having head failure."

Of course the reason why Murton's insert has the new function described by Sergy is because *nothing but the insert is disposed above the rod flange, which allows the sleeves to seat on the insert while the insert seats on the rod flange.*

THIS COURT IS THE FIRST TRIBUNAL TO RECOGNIZE THE
SIGNIFICANCE OF THE LIMITATION CONTAINED IN CLAIM 2
ALTHOUGH THE LIMITATION WAS ARGUED BY THE PATENT
OFFICE TRIBUNALS

The limitation of claim 2 that the insert is the sole means underlying the lateral projection at the bottom of the rod was argued to the Patent Office tribunals (PX 1, pp. 83-84, 116-117) but, despite the fact that that limitation was in the claim when the application was filed and has remained in it continuously since then, it does not appear that either the examiner or the Board of Appeals appreciated or even considered the limitation. It is nowhere even so much as mentioned by either Patent Office tribunal. Sergy testified as follows (R. 87) :

"Q. What did the Examiner say about the limitation in claim 2, 'said means being the sole means underlying the lateral projection at the bottom of the rod'?

"A. This was not mentioned by the Examiner in any way".

Defendant in his brief (DB 7) adverts to the limitation in question and then undertakes to demonstrate that the limitation is broader than the invention by the sketches appearing on two unnumbered pages between pages 3 and 4 of defendant's brief. Those sketches, which are misleading, self-serving and contrary to the evidence, have been treated fully in plaintiffs' reply brief.

This Court is the first to recognize the force of the limitation in claim 2 which certainly does avoid the British patent, and if the Court had had in mind the Bacon and Sears Patents at the time of considering the limitation its determinative effect on this case would have been appreciated.

THE APPLICABLE LAW AS TO DISCLOSURE

At page 7 of the Court's opinion the Court recognizes the "advantageous construction" of Murton but states that since it is not "directly set forth in the specification" or "recited by the claims . . . the extensive arguments on this point may only be accorded slight probative weight". *The advantageous construction is very clearly set forth in Murton's drawings which are part of his specification.* The drawings are part of the disclosure and adequately support the claim. Please see the authorities cited at page 18 of plaintiffs' main brief.

We also respectfully refer to the authorities cited at pages 39 and 40 of plaintiffs' main brief which establish that if the structure claimed accomplishes advantages over the prior art (which is an agreed fact in the present case) *it is not necessary that the principle of operation be explained in the specification or even that the inventor understand or be able to state the scientific principle underlying his invention.*

It is vital to the ends of justice that distinction be made between the *defining of a new and useful structure* and the *recognition* by the applicant of the *advantageous results* accruing from its use. Murton's claim 2 defines a new and useful structure. The fact that Murton did not explain the advantages of that structure in his specification does not redound to his disadvantage. Since this question appears to be the focal point involved in the present petition we are presuming to quote from a number of the long recognized leading cases in point. The leading Supreme Court decision is *Diamond Rubber Company v. Consolidated Rubber Tire Company*, 220 U.S. 428, in which the court held (pp. 435-436) :

"A patentee may be baldly empirical, seeing nothing beyond his experiments and the result; yet if he has added a new and valuable article to the world's utilities he is entitled to the rank and protection of an inventor. And how can it take from his merit that he may not know all of the forces which he has brought into operation? It is certainly not necessary that he understand or be able to state the scientific principles underlying his invention, and it is immaterial whether he can stand a successful examination as to the speculative ideas involved. *Andrews v. Cross*, 8 Fed. Rep. 269; *Eames v. Andrews*, 122 U. S. 40, 55; *St. Louis Stamping Co. v. Quinby*, 16 Off. Gaz. 135; *Dixon Wood Co. v. Pfeifer*, 55 Fed. Rep. 390; *Cleveland Foundry Co. v. Detroit Vapor Stove Co.* (C.C.A. Sixth Circuit), 131 Fed. Rep. 853; *Van Epps v. United Box Co.* (C.C.A. Second Circuit), 143 Fed. Rep. 869; *Westmoreland Specialty Co. v. Hogan* (C.C.A. Third Circuit), 167 Fed. Rep. 327. He must, indeed, make such disclosure and description of his invention that it may be put into practice. In this he must be clear. He must not put forth a puzzle for invention or experiment to solve but the description is sufficient if those skilled in the art can understand it. This satisfies the law, which only requires as a condition of its protection

that the world be given something new and that the world be taught how to use it. It is no concern of the world whether the principle upon which the new construction acts be obvious or obscure, so that it inheres in the new construction".

The leading lower court decision, cited with approval by the Supreme Court in the *Diamond Rubber* case and often cited by other courts, is the decision of the Circuit Court of Appeals for the Third Circuit in *Westmoreland Specialty Co. et al. v. Hogan*, 167 F. 327, in which the court held (p 328) :

"It is true that at the time this patent was applied for the particular process of moisture supply from a metal cap and the insulating capacity of celluloid to stop it were not stated, or, indeed, known to the patentee. He knew metal caps would oxidize, and substituted celluloid to stop oxidation, and such use has shown that the stoppage of oxidation resulted in keeping the salt dry. *But the mere failure of a patentee to realize all the benefits and possibilities of his invention is not fatal*". The after-discovery of unsuspected usefulness in a disclosed apparatus, far from detracting from its value, may serve to enhance it. It is the benefits which test, use, and time unfold that really determine merit. It is this after-test, the test of use, that proves the worthlessness of the great majority of patents and establishes the value of the few. We are therefore of opinion that the after-recognition of the scientific fact of the insulating capacity of his celluloid dredge cover should not affect the validity of Hogan's patent".

In *Eames v. Andrews*, 122 U.S. 40, the Supreme Court held (pp. 55-56) :

"It is to be observed that the scientific theory and principle, the application of which is supposed to constitute the invention of Colonel Green, are not

* Italics for emphasis in quotations ours throughout this petition.

set forth either in the original or reissued patents. This feature was commented upon by Mr. Justice Blatchford in *Andrews v. Cross*, 19 Blatchford, 294, 305, as follows: *'It may be that the inventor did not know what the scientific principle was, or that, knowing it, he omitted, from accident or design, to set it forth. That does not vitiate the patent. He sets forth the process or mode of operation which ends in the result, and the means for working out the process or mode of operation. The principle referred to is only the why and the wherefore. That is not required to be set forth. Under § 26 of the act of July 8, 1870, 16 Stat. 201 under which this re-issue was granted, the specification contains a description of the invention and of "the manner and process of making, constructing, compounding, and using it," in such terms as to enable any person skilled in the art to which it appertains to make, construct, compound, and use it; and, even regarding the case as one of a machine, the specification explains the principle of the machine, within the meaning of that section, although the scientific or physical principle on which the process acts when the pump is used with the air-tight tube, is not explained. An inventor may be ignorant of the scientific principle, or he may think he knows it, and yet be uncertain, or he may be confident as to what it is, and others may think differently. All this is immaterial, if by the specification the thing to be done is so set forth that it can be reproduced.'*"

In *Kohler v. Cline Electric Mfg. Co. et al.*, 28 F. 2d 405, the District Court for the Northern District of Illinois said (p. 406) :

"It is not the result, effect, or purpose to be accomplished which constitutes an invention, but the mechanical means or instrumentalities by which the object sought is to be attained. Patents cover the means employed to effect results. When the patentee has plainly described his mechanism, he has the right to every use to which his device can be applied,

and to every way in which it can be utilized to perform its function, whether or not he was aware of all these uses or methods of use when he secured his patent. *Miller v. Eagle Manufacturing Co.*, 151 U.S. 186, 14 S. Ct. 310, 38 L. Ed. 121; *Western Electric Co. v. La Rue*, 139 U. S. 601, 606, 11 S. Ct. 670, 35 L. Ed 294; *Roberts v. Ryer*, 91 U. S. 150, 23 L. Ed. 267; *National Hollow Brake Beam Co. v. Interchangeable Brake Beam Co.* (C.C.A.) 106 F. 693, 709; *Goshen Sweeper Co. v. Bissell Carpet Sweeper Co.* (C.C.A.) 72 F 67; *Stearns & Co. v. Russell* (C.C.A.) 85 F. 218."

See also the decision of the Seventh Circuit Court of Appeals in *Western Electric Co. v. Sperry Electric Co.*, 58 F. 186, 196:

"The invention is in the device, which may have one, two, or more functions, one of great and another of trifling worth. It may be supposed to have a function which it has not. The patent is upon the device, and not upon the functions, real or supposed; and if the device is appropriated in its essential features it will be an infringement, notwithstanding some change in the location and relation of parts, whereby a doubtful function of little comparative worth is eliminated. At first *Scribner*, it is clear, believed the up-and-down compensating movement of the armature in the main circuit, irrespective of the action of the regulating magnet, to be an important feature of his lamp; but before the patent issued, without changing the drawing or modifying the structure of his device in the least, he presented an amended specification, in which he repudiated that idea, and described the armature in operation as assuming and holding a definite relation to the magnet. So long as he did not change the structure of his device or invention, he had the right to change the specification, even though he did it with reference to the *Sperry* patent, which was applied for and issued while his application was pending; and, the specification being as we find it, there is no support for the proposition that for the purpose of preserv-

ing the possibility of a function, which the patentee had repudiated before the patent issued, the claims, though worded differently, should be so read as to cover only the exact construction and relation of parts illustrated in the drawing. The proposition is not reasonable, nor, so far as we know, supported by authority."

The decisions above cited are the leading cases which have been looked to as controlling and frequently cited through the years. A recent decision of the Court of Customs and Patent Appeals which is in point here is *Application of Chilowsky*, 229 F. 2d 457, in which the Court, including Judge Jackson, held (p. 463) :

"We do not think that the failure of the application to set forth certain theoretical factors, nor the allegation that the disclosure is based on speculation, affords a proper basis for rejection. The application must be judged by what it discloses rather than by the supposed mental state of the applicant when his application was prepared. If the disclosure is sufficient to enable the ordinary skilled worker in the art to practice the invention, it is immaterial whether the applicant understood or explained all the principles underlying it."

While later certain of Chilowsky's claims were held unpatentable the rule enounced by the Court as above set forth was nowise affected.

SUMMARY

Summarizing, it is established and agreed by all concerned that Murton has made an important invention. It is also submitted to be clear that claim 2 properly defines the *structure* whereby Murton's new and useful results are obtained. It is also submitted that the applicable law is clear that so long as the *structure which obtains the advantages of the invention* is adequately disclosed it is not necessary for the inventor to have described the advantages in his specification or even to have understood them. The authorities cited in the preceding section of this petition are submitted to be crystal clear on this point.

What is about to be stated in this paragraph is not in the record but it is believed to be fair to make the statement by way of explanation. When the invention was brought to the writer (Mr. Hoopes) in 1958 the writer had no background in the art and although he understood the structure he did not understand its advantages. Undoubtedly the advantages were understood by Murton and attempted to be explained, but because of the writer's inexperience in the art the advantages were not incorporated in the specification. But whether this is so or whether Murton himself at that time did not fully appreciate the potential of his invention is unimportant in view of the well established law. *What is important is that Murton's structure by which the advantages are obtained is properly disclosed and properly claimed in claim 2.*

**Order of the United States District Court
For the District of Columbia**

(Filed September 24, 1964)

The Court having duly considered plaintiffs' petition for reconsideration, and defendant's opposition thereto, it is, this 24th day of September, 1964,

ORDERED, that said petition be, and hereby is, denied.

JOSEPH R. JACKSON

United States District Judge

Notice of Appeal

(Filed November 12, 1964)

Notice is hereby given this twelfth day of November, 1964, that plaintiffs hereby appeal to the United States Court of Appeals, District of Columbia Circuit, from the judgment of this court entered June 25, 1964 (plaintiffs' position for reconsideration denied September 24, 1964).

**Appellants' Statement of Points Pursuant to Rule 15
of This Court**

(Filed December 30, 1964)

Appellants intend to rely on the appeal upon the following stated points:

1. Claim 2 of the Murton application in issue (the only claim before this Court) distinguishes both in terms and in substance over all three references — Bacon United States patent No. 1,719,795, Sears United States patent No. 1,843,175 and British patent No. 12,291/1904 — by the specific limitation that the insert means (the means inserted downwardly into the well of the head above the rod flange and connected with the head) are *"the sole means overlying the lateral projection at the bottom of the rod"*.

2. Said limitation—that the insert means are the sole means overlying the lateral projection at the bottom of the rod—makes possible the bearing of the rod protecting sleeves upon the insert and the transmission of the thrust of the sleeves through the insert to the rod flange, thereby relieving the thin-walled upper portion of the stopper head of the stress imposed by the downward thrust of the sleeves when the stopper is jammed down into the ladle nozzle, thereby largely eliminating danger of stopper head failure.

3. (a) In Bacon, in which the pin 2 must be read as the rod flange and the channels 9 as the insert means, portions of the stopper head 5 overlie both ends of the pin 2 as clearly shown in Fig. 2 of Bacon.

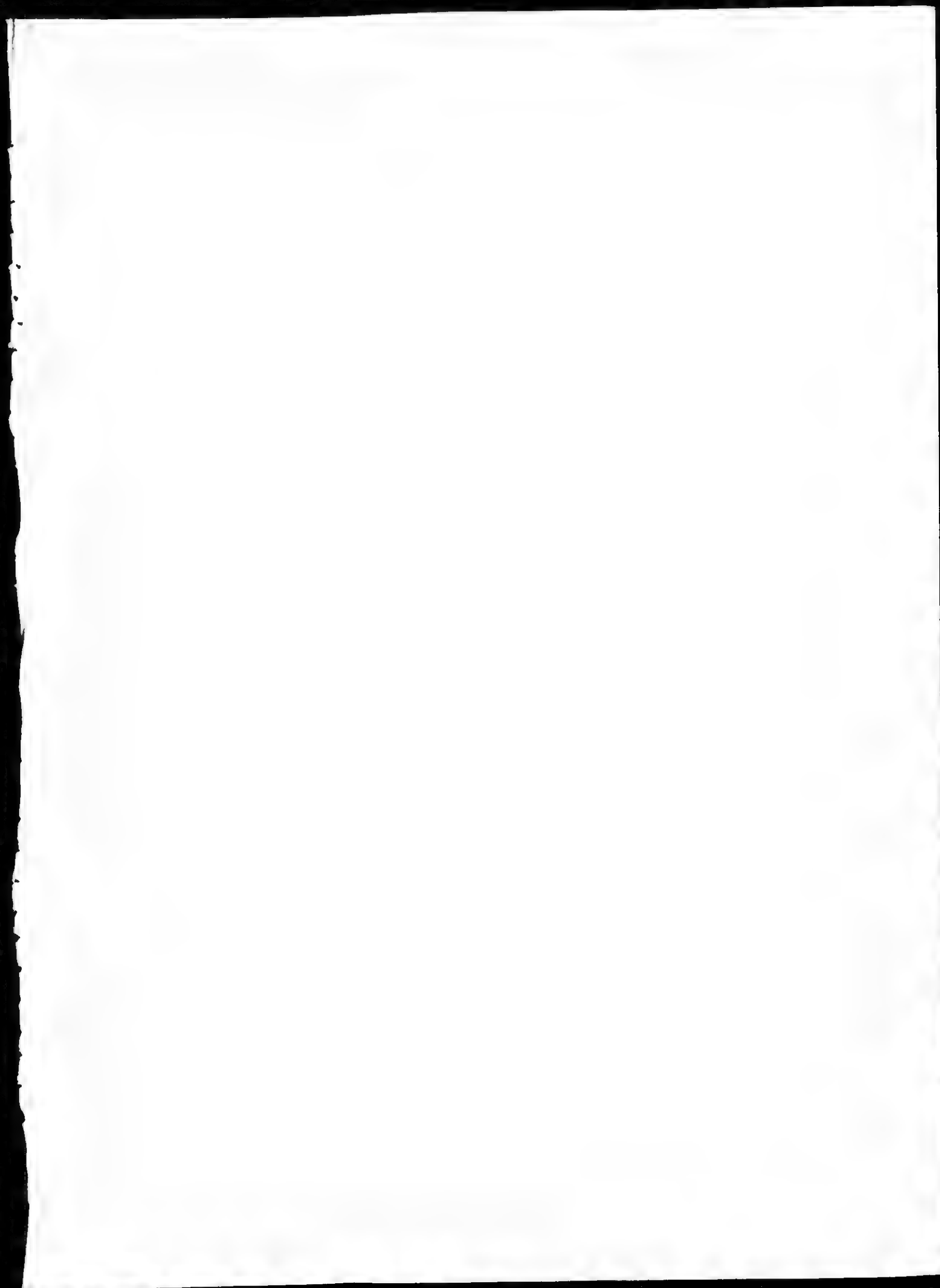
(b) In Sears, in which the member 34 (Figs. 2, 4 and 6) must be read as the rod flange and the plate 29

(Figs. 2, 4 and 5) as the insert means, portions of the needle 20, which must be read as the stopper head, overlie both ends of the member 34 as clearly shown in Fig. 2 of Sears.

(c) In the British patent a portion of the stopper head D overlies the rod flange F as clearly shown in Fig. 5 of the British patent.

Thus in all of the references it is *impossible* for the thrust of the sleeves to be transmitted through the insert means to the rod flange because in each case a portion of the stopper head prevents such transmission of thrust; while in the Murton structure no part of the stopper head—or anything else—other than the insert overlies the rod flange, enabling the sleeves to bear on the insert and transmit their thrust through the insert to the rod flange as very clearly illustrated in Fig. 6 of the Murton application.

4. The limitation in question has been in Claim 2 since filing of the Murton application, is referred to in the Murton specification, was argued to the examiner and to the Board of Appeals, was emphasized in the testimony at the trial and was argued to the trial court; yet it was never mentioned or its presence recognized in any way by the examiner or the Board. The first recognition of the limitation was by the trial judge who appreciated that claim 2 avoids the *British patent* because of "that claim's requirement that the insert be the 'sole means overlying the lateral projection at the bottom of the rod' ". However, the trial judge overlooked that *claim 2 avoids Bacon and Sears for the same reason.*



BRIEF FOR APPELLANTS

IN THE
United States Court of Appeals
FOR THE DISTRICT OF COLUMBIA CIRCUIT

NO. 19083

**CRAWFORD B. MURTON and VESUVIUS
CRUCIBLE COMPANY, Appellants,**

v.

**DAVID L. LADD, Commissioner of Patents,
Appellee.**

**Appeal From a Judgment of the United States District
Court for the District of Columbia**

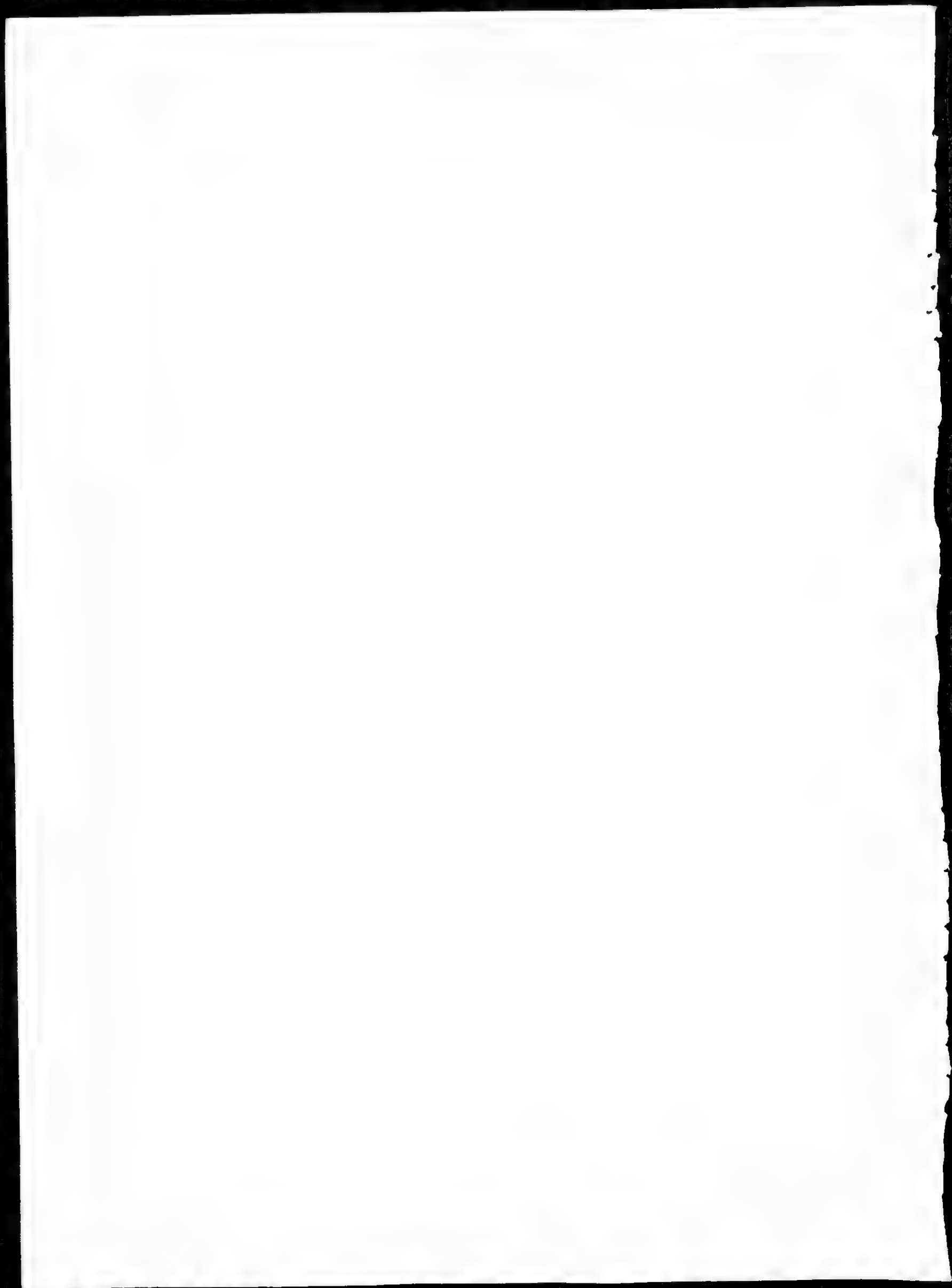
United States Court of Appeals
for the District of Columbia Circuit

FILED FEB 8 1965

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**STATEMENT OF QUESTION PRESENTED
TO THE COURT FOR DECISION**

When a claim of a patent application is based upon and limited to a feature of the applicant's structure (insert means "being the sole means overlying the lateral projection at the bottom of the rod"), which feature, though repeatedly argued and relied upon by the applicant, was never mentioned and apparently never perceived or recognized by the patent examiner or Board of Appeals, and there is substantial evidence of the inventiveness of that feature and no evidence contra, and the trial court, mentioning that feature for the first time it had been mentioned by any tribunal since filing of the patent application, recognized that because of it the claim distinguishes over one of the three prior patents cited against the application but overlooked that the claim distinguishes in the same way over the other two prior patents and failed to consider that feature of the claim in relation to such other two prior patents, is not the applicant entitled to consideration of that feature of the claim in relation to such other two prior patents and a holding that because the claim includes and is limited to that feature it also distinguishes over such other two prior patents in the same way as it distinguishes over the first prior patent and is allowable?

IN THE
United States Court of Appeals
FOR THE DISTRICT OF COLUMBIA CIRCUIT

NO. 19083

CRAWFORD B. MURTON and VESUVIUS
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v.

DAVID L. LADD, Commissioner of Patents,
Appellee

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*Civil Rule and cases chiefly relied on are marked by asterisks.

JURISDICTIONAL STATEMENT

This is a civil action against the Commissioner of Patents by applicants for a patent dissatisfied with the decision of the Patent Office. Jurisdiction is conferred on the District Court by the Act of July 19, 1952, c. 195, §1, 66 Stat. 803, 35 U.S.C. 145. The complaint (JA* 3) was filed within the time set by the Commissioner of Patents pursuant to that act; Patent Office Rule 304 (37 C.F.R. §1.304; Title 35, U.S.C.A. App. I, page 743). Following trial the complaint was dismissed (JA 177) and a timely petition for reconsideration as to claim 2, technically a motion for a new trial under Civil Rule 59(a)(2) (JA 178), was filed. The petition was denied (JA 190) and a timely notice of appeal (JA 190) was filed pursuant to Civil Rule 73(a). This court has jurisdiction by virtue of 28 U.S.C. §1291.

*Joint Appendix.

STATEMENT OF THE CASE**The Parties**

The appellants, plaintiffs below, are the applicant for patent, Crawford B. Murton, and the assignee of the entire right, title and interest in the application and invention, Vesuvius Crucible Company, Swissvale, Pennsylvania, a corporation of Pennsylvania (JA 3, 65).

The appellee, defendant below, is the United States Commissioner of Patents. When the suit was filed David L. Ladd was Commissioner of Patents. He has since been succeeded by Edward J. Brenner, but since the suit is against the person holding the office of Commissioner of Patents the final judgment in this case will have effect on whatever person holds the office at the time of entry of the final judgment. Civil Rule 25(d)(1)*

The Background of the Murton Invention: The Art to Which the Invention Relates.

The invention relates to the ladle stopper art. Ladle stoppers of the type to which the invention relates are used for controlling the outflow of molten steel through the nozzle in the bottom of so-called "bottom pour" ladles which receive the molten steel from open hearth steel-making furnaces (JA 13-4).

PX 2 (JA 145) illustrates a bottom-pour ladle 2 which may contain some 350 tons of molten steel at a temperature of 2900° F. (JA 13-4). The molten steel is colored yellow; the layer of slag atop the molten steel

*The personnel of the clerk's office of this Court preferred to have the appeal perfected without an order of substitution and continuing to use the name of David L. Ladd as Commissioner of Patents, and their preference was followed.

is colored red (JA 16). The nozzle in the bottom of the ladle is marked 3 (JA 13). Outflow of molten steel through the nozzle 3 is controlled by the ladle stopper, which is the focal point of this case, the functional element of the ladle stopper being the stopper head 4 (JA 13, 65-6).

The stopper head 4 is made of refractory material (JA 13, 66). It is carried on the lower end of a 16-foot long heavy steel rod 5 (JA 13, 66). The rod carrying the stopper head is raised and lowered by rigging shown at the left in PX 2 which may be operated either manually as shown or by suitable power operated mechanism (JA 13, 16-7). A series of refractory sleeves 6 (JA 14, 72, 79, 161) surround the steel rod 5 above the stopper head 4 to protect the rod from the heat of the molten steel in the ladle.

When the stopper rod 5 carrying the stopper head 4 and the sleeves 6 is raised molten steel flows out of the nozzle 3 (JA 13). To shut off the outflow of molten steel through the nozzle 3 the stopper is jammed down with great force into the top of the nozzle (the position shown in PX 2) to close the nozzle (JA 16-7). It is necessary to apply great force to the stopper because molten steel around the nozzle tends to solidify and is in a semi-molten or plastic condition and such partly solidified steel has to be squashed or shaped to allow the stopper head to effectively seat in the nozzle and shut off the outflow of molten steel therethrough (JA 17).

PX 2 (JA 145) shows a row of ingot molds 8 into which the molten steel from the ladle 2 is being poured or "teemed" to produce steel ingots (JA 16). There may be 60 or 70 ingot molds in the line (JA 66). After each ingot mold is filled with molten steel the stopper must

be jammed down into the nozzle to shut off the flow of molten steel, after which the ladle is moved by the overhead crane into position to teem molten steel into the next ingot mold in the line, whereupon the stopper is raised to permit molten steel to flow into the next mold (JA 16-7).

The Background of the Murton Invention: As Exemplified by the Patents Cited Against Murton by the Patent Office.

The state of the art prior to Murton's invention is well exemplified by the three references cited against Murton by the Patent Office. These are:

Sears United States Patent
No. 1,843,175 (JA 147-51)

Bacon United States Patent
No. 1,719,795 (JA 153-5)

British Patent No. 12,291/1904
(JA 157-60)

In both Sears (JA 18-9, 147) and Bacon (JA 18, 31, 153) the rod protecting sleeves (21 in Sears; 4 in Bacon) bear directly atop the head. The British patent does not show any sleeves, though the specification states that the rod is "built up with sleeves in the ordinary way" (JA 160) and the evidence is undisputed that the sleeves of the British patent will also bear on the stopper head (JA 19, 31).

The Background of the Murton Invention: The Problem Long Existing Unsolved in the Art — Stopper Head Failure Due to the Bearing of the Rod Protecting Sleeves Against the Top of the Stopper Head.

The references range from thirty-six to sixty-one years in age (JA 147, 153, 157). They evidence a long existing problem arising from the fact that the sleeves bear directly on the top of the stopper head (JA 19-20).

Sergy, assistant superintendent of the open hearth department of Jones & Laughlin Steel Corporation, one of the country's largest steel manufacturers (JA 10), with fourteen years actual experience in use of ladle stoppers of the prior type and the Murton type (JA 10-1), explained the problem (JA 17, 19-20):

"It is necessary to thrust the ladle stopper down with great force to close the nozzle. Steel tends to solidify around the top of the nozzle and tends to interfere with the nose of the stopper head from sealing directly down on the nozzle to close off the 2-inch orifice. The head is repeatedly jammed down to shape that semi-solid mass into a pocket so that the stopper head can very effectively close off the top of that nozzle.

"This occurs at a time when the stopper head has been subjected to a great deal of thermal stress. Compounded on that thermal stress is this mechanical stress that continues throughout the pouring of the steel. This is at a time when the head is least able to endure such a thrust.

* * * * *

"Every time the stopper is jammed down into the nozzle the inertia of the sleeves causes a mass or weight to come to bear on the sleeves which then bears on the head which then sub-

jects the head to acute possibility of failure. The head stops at the nozzle on the downward thrust. The sleeves continue to apply a thrust down onto the head. This is at a time when the head is most vulnerable to receive that thrust.

"Q. Have you experienced failure of a stopper head in a ladle in which the sleeves protecting the stopper head were supported directly on the stopper head?

"A. Yes, I have.

"Q. What happened?

"A. When the sleeves are supported directly on the stopper head this causes very pronounced failure. The failure of a stopper head results in an uncontrollable stream of metal coming out of the bottom of this ladle. When we remember that this ladle contains 350 tons of molten steel and steel will flow out of that ladle at the rate of 20 tons a minute, the uncontrollability of this stream creates havoc. The molds are filled very quickly and the ladle is moved from one mold to another, to another, to another with this tremendous amount of splashing taking place. As much steel as possible is tried to be recovered in such a case, but there is a great deal of steel lost. The safety of the men are imperilled and equipment is destroyed, and a king-sized clean up job is required when this is all over.

"Q. What is the financial loss incident to such an occurrence, if you know?

"A. The financial loss of such an occurrence will range between \$5,000.00 and \$10,000.00.

"The Court: A year, a month, a week, a day, or what?

"The Witness: Per occurrence.

"The Court: What?

"The Witness: For each occurrence.

"The Court: I see.

"By Mr. Hoopes:

"Q. Now for each occurrence you mean each stopper head failure, is that correct?

"A. For each stopper rod failure that results in a full running stopper as I have explained, the financial loss will range between \$5,000.00 and \$10,000.00 for that occurrence."

The seriousness of the problem is emphasized by the undisputed fact that stopper head failures with stopper heads of the type available prior to Murton's invention amounted to about 10% (JA 21).

The Murton Invention.

The Murton invention for the first time solves the long existing problem by reducing stopper head failures from 10% to less than 3% (JA 21).

Murton relieves the upper thin wall portion of the stopper head of the downward thrust of the rod protecting sleeves when the stopper is jammed down into the nozzle of the ladle to shut off the flow of molten steel from the ladle, thus eliminating the primary source of stopper head failure (JA 48-9). This result is accomplished by a *new insert* in the stopper head (JA 26).

Murton's drawings show two forms of the invention which "accomplish the same result insofar as increasing stopper head life is concerned" (JA 21). The first form is shown in Figs. 1-5 in which the insert is designated 9 and is of the so-called "lug type" (JA 21-2, 75, 77) and the second form is shown in Fig. 6 in which the insert is designated 9a and is of the so-called "screw type" (JA 23, 79). Claim 8 (JA 4, 73) directed specifically to the form of head having the screw type insert has been allowed (JA 4, 23, 89, 167).

The key to the Murton invention is that the insert, 9 in Figs. 1-5 (JA 75, 77) and 9a in Fig. 6 (JA 79), serves to connect the stopper head to the stopper rod while being adapted, *because it is the sole means overlying the lateral projection at the bottom of the rod* (as specified in the claim in issue presently to be considered), to relieve the upper thin wall portion of the head of the downward thrust of the sleeves by transmitting the sleeve thrust through the insert to the rod flange (JA 21-2).

Sergy succinctly explained the invention (JA 21):

"Murton differs from the references cited, and he differs in an important and very critical manner. Murton's stopper head has a separate insert. This insert is applied or inserted into the stopper head overlying the rod flange and is connected to the head. When the rod is raised the head is raised. The weight of the sleeves cannot be carried by the head. The weight of the sleeves is carried by the insert, and the thrust of the sleeves is transmitted through the insert to the rod flange. It frees the head of any such stress and there is less danger of head failure."

Referring first to Fig. 6 (JA 79), the insert 9a is screwed into the head to seat on the rod flange and thus connect the head to the rod (JA 71-2) while supporting the sleeves 18 as clearly shown in Fig. 6. Thus the sleeve thrust passes through the insert to the rod flange and not through the upper thin wall portion of the head (JA 22-3).

The structure of Figs. 1-5 is exactly equivalent to that of Fig. 6, the insert 9 in Fig. 5, like the insert 9a in Fig. 6, being the sole means overlying the rod flange (JA 72). The insert 9 of Fig. 5 has lugs 10 which when the parts are assembled pass through vertical channels 6 in the head (Fig. 1, JA 75, Fig. 4, JA 77, JA 22, 70-1)

whereupon the insert is turned through 90° to position the lugs 10 under the shoulders 12. The insert overlies the rod flange 17 and is adapted to receive the thrust of the sleeves and transmit such thrust to the rod flange, exactly as in Fig. 6 (JA 26-7).

Fig. 5 (JA 77) does not show a sleeve whereas Fig. 6 shows sleeve 18 seated on insert 9a (JA 79). This was the subject of testimony by Sergy (JA 27):

"Q. You have stressed the fact that the Murton insert in either form serves to support the sleeves and transfer their thrust to the rod flange freeing the stopper head from the thrust of the sleeves.

"Is this disclosed in the Murton Application?

"A. Yes, the sleeve shown in figure 6 is 18. It is shown resting directly on the insert 9-A. The insert 9-A projects upward and receives the thrust of the sleeve.

"Q. No sleeve is shown in figure 5. Is the teaching of that figure different than the teaching of figure 6?

"A. No, the teaching in that figure is the same. In this particular case the insert is noted to be flush with the top of the head. However, a sleeve suitable for this application is a matter of design.

"In this particular case a sleeve with a downward angular projection would dispose about the rod and rest on the insert."

In the physical exhibits PX 15 is the stopper head of Figs. 1-5, PX 17 is a sleeve for use with PX 15 (demonstrated by Sergy, JA 22), and PX 18 is the stopper head of Fig. 6 and PX 19 is a sleeve for use with PX 18 (demonstrated by Sergy, JA 23).

The Claim in Issue.

The sole claim in issue is claim 2 (JA 4, 73) which reads as follows:

"2. A stopper for a ladle or similar receptacle comprising a refractory head having a well extending downwardly thereinto, a rod having a lateral projection at its bottom inserted downwardly into the well and means separate from the head also inserted downwardly into the well above the lateral projection at the bottom of the rod into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well and connected with the head whereby to attach the rod to the head, said means being the sole means overlying the lateral projection at the bottom of the rod."

The claim covers both forms of Murton's ladle stopper. Sergy read the claim with reference numerals applying to Figs. 1-5 (JA 25-6) and again with reference numerals applying to Fig. 6 (JA 26-7).

The focal point of this case is the last clause of claim 2: "said means [the insert 9 of Figs. 1-5 or 9a of Fig. 6] being the sole means overlying the lateral projection at the bottom of the rod."

The limitation just quoted characterizes Murton's invention, distinguishes it from all three references and is responsible for Murton's new and useful result, transmitting the thrust of the sleeves through the insert to the rod flange and relieving the upper thin wall portion of the stopper head of stress imposed by the sleeves, thus minimizing stopper head failure. This was made crystal clear during the cross-examination of Sergy by defendant's counsel (JA 48-9):

"Q. Now I have this question, and I think this is probably in clarification of the plaintiffs' case,

but I want it absolutely clear on the record what we are talking about.

"When you speak of the fact that when the sleeves bear on this insert and thus the thrust of the sleeves is carried directly to the flange, and you say there is no thrust on the head, do you mean that there is no thrust on this portion of the head? And I am indicating the wall portion of the head of figure 5. Or do you mean that there is no thrust carried down into the bottom of the head when the ladle stopper is pushed downwardly to close the opening?

"A. I say the head is free of thrust on the first position that you have shown.

"Q. That is in the walls?

"A. Yes.

"Q. Now, when you are bringing the ladle [stopper] down, in other words, you carry your stresses from the sleeves through the members 10 to flange 17 and then down to the thick portion of the head?

"A. Yes.

"Q. And the thick portion of the head is adequate to carry the thrust?

"A. It is the strongest part of the head.

"Q. Yes. The references have always been made to the head as a whole. Therefore, you concede that the thrust, of course, goes down through the orifice through the thickened portion of the head, and your point, as I take it, is that you want to avoid thrust in the thin wall portions; is that correct?

"A. That is correct."

The sleeves are not recited in the claim as they are not part of the ladle stopper per se but are to protect the stopper rod from the heat of the molten metal. Compare Bacon's claims (JA 155); although Bacon discloses sleeves to protect the stopper rod from the heat of the molten metal he does not include the sleeves in his claims.

Omission of the sleeves from Murton's claim is proper. The claim defines the *structure* which produces the *advantage* of supporting rod-protecting sleeves free of bearing on the top of the stopper head. Sergy testified (JA 27-8):

"Q. Murton's claims do not mention the sleeves. As a person skilled in the art, does this affect your understanding of the Murton invention?

"A. No, it doesn't.

"The ability of the insert to support the sleeves thereby transmitting the thrust through the rod flange is an *advantage** of the Murton invention.

"Murton claims a *structure* which produces this *advantage*, enabling the insert to support the sleeves and thereby transfer the thrust to the rod flange."

The History of the Critical Limitation of Murton's Claim 2.

The critical limitation of Murton's claim 2 — "*said means being the sole means overlying the lateral projection at the bottom of the rod*" — was in the claim as filed (JA 73) and has remained unchanged from Murton's filing date to the present (JA 167-8).

The limitation was specifically adverted to in Murton's specification as filed (JA 66, 72).

The limitation was argued to the examiner (JA 82) and at length to the Board of Appeals (JA 116, 129).

The limitation was the subject of considerable testimony before the trial court (JA 22, 24-7, 34) and of a petition for reconsideration (JA 178).

Yet the limitation *was not mentioned at all*, either by the examiner or by the Board of Appeals, throughout

*Italics in quotations ours throughout this brief.

the entire prosecution of the Murton application in the Patent Office. The record is devoid of any indication that the limitation was ever recognized or even read by anyone in the Patent Office during the period of over four years during which the Murton application was pending before the Patent Office tribunals.

The first and only recognition of the limitation was by the trial court in its opinion where the limitation was recognized as creating a distinction over the British patent (JA 175). The Court did not discuss and apparently did not consider the limitation in relation to Sears or Bacon.

**Analysis of the Opinion of the
District Court.**

The District Court in its opinion reviewed the disparate positions taken by the examiner (JA 169-72), the Board of Appeals (JA 172-3) and the defendant before the Court (JA 173) and said (JA 173):

"The Court must admit that it is somewhat disappointed by the divergence of approach manifested by the Patent Office in this case. It is confronted with the problem of selecting one, or indeed none, of three disparate propositions. Whether the "presumption of correctness" normally accorded to Patent Office adjudications is wholly rebutted by such circumstances, the Court does not decide. It should be obvious, however, that it is at least severely weakened."

The Court further said (JA 174):

"The Court, after thoroughly reviewing all three different contentions of the Patent Office, has determined that the analysis by the Examiner in his Answer was correct."

14 *Analysis of the District Court's Opinion.*

Six claims — claims 2, 5, 7, 9, 12 and 13 — were in issue before the Patent Office (JA 103-5); all but claim 2 were withdrawn in the District Court (JA 178).

In the Examiner's Answer, the "analysis" of which the District Court followed, all six claims were considered together as though they were lumped together into a single claim and were "rejected as unpatentable over the British patent, Bacon or Sears taken individually" (JA 122). But *the only claim containing the critical limitation that the insert is "the sole means overlying the lateral projection at the bottom of the rod" is claim 2* (JA 103).

Neither the examiner nor the Board made any reference to the critical limitation in claim 2 and it would appear that they were unaware of its presence. The reasoning underlying the rejection of the claims *as a group* in the Examiner's Answer had no relation to such limitation (JA 122-3).

Yet the District Court followed the examiner's "analysis" (JA 174) and rejected all the claims as a group (JA 174).

However, the District Court departed in one respect from the examiner. After rejecting all of Murton's claims as a group the Court found that the critical limitation distinguishes from the British patent (JA 175) which indeed it does as the portion of the head D of the British patent to the right of the rod in Fig. 5 of that patent overlies the rod flange F and positively prevents the thrust of the rod protecting sleeves from being transmitted to the rod flange through the insert (JA 157).

The Court gave no consideration to whether the critical limitation distinguishes from *Sears and Bacon*. It does so distinguish as plaintiffs demonstrated in their Petition for Reconsideration as to Claim 2 (JA 178 ff.).

The District Court denied the Petition for Reconsideration without opinion or comment (JA 190).

RULE INVOLVED

Involved is the opening portion of Civil Rule 52(a):

“In all actions tried upon the facts without a jury the court shall find the facts specially and state separately its conclusions of law thereon”

STATEMENT OF POINTS

1. The District Court erred in affirming the rejection of claim 2 without considering the critical limitation in the claim — that the insert is “the sole means overlying the lateral projection at the bottom of the rod” — in connection with the Sears and Bacon patents on which the claim was rejected.

2. The District Court erred in holding that Sears and Bacon have insert means which are, or by modification can be made to be, insertable downwardly into the well of the head above the lateral projection at the bottom of the rod.

3. The District Court erred in holding against Murton the non-inclusion in Murton’s claim of the rod-protecting sleeves.

4. The District Court erred in not complying with the mandate of Civil Rule 52(a) to “find the facts specially and state separately its conclusions of law thereon”.

SUMMARY OF ARGUMENT

1. Murton solved a problem long existing in the art of relieving the upper thin wall portion of the stopper head of the downward thrust of the rod protecting sleeves, reducing stopper head failure from 10% to less than 3%.

2. Murton solved the problem by providing an insert connected with the stopper head and overlying the rod flange to fasten the stopper head to the rod flange, the insert being the sole means overlying the rod flange so that no part of the stopper head is interposed between the rod protecting sleeves and the rod flange whereby the thrust of the sleeves may be transmitted by the insert to the rod flange.

3. Claim 2—the sole claim in issue before this Court—clearly and properly defines the invention, specifying that the insert is “the sole means overlying the lateral projection at the bottom of the rod”.

4. In all three of the references cited against Murton by the Patent Office examiner—Sears, Bacon and the British Patent—the rod protecting sleeves seat directly on the top of the head and a portion of the head overlies the rod flange which prevents the transfer of the thrust of the sleeves to the rod flange as in the Murton stopper. Also neither Sears nor Bacon has insert means “inserted downwardly into the well above the lateral projection at the bottom of the rod”.

5. The rod-protecting sleeves are not recited in Murton's claim as they are not part of the stopper per se. This is proper and nowise militates against the validity of the claim. The claimed stopper structure has the ad-

vantage of supporting rod-protecting sleeves free of bearing on the top of the stopper head. The function of a patent claim is to define the advantageous structure, not to recite the advantages of the invention.

6. The critical limitation of the claim—that the insert is “the sole means overlying the lateral projection at the bottom of the rod”—was in the Murton specification and claim as filed and was repeatedly argued to the examiner, the Board of Appeals and the District Court but was never mentioned and apparently never recognized by either the examiner or the Board and was mentioned by the District Court only as constituting a distinction over the British Patent. No tribunal, including the District Court, ever considered the critical limitations in relation to Sears and Bacon.

7. Throughout the consideration of the Murton application by the Patent Office tribunals and the District Court, claim 2—the sole claim here in issue—was grouped with other claims which have since been withdrawn and its critical limitation not recognized except for its recognition by the District Court as distinguishing over the British Patent.

8. The District Court did not “find the facts specially and state separately its conclusions of law thereon”, as required by Civil Rule 52(a), as to what if any bearing the Court deemed Sears and Bacon to have on the claim in issue. This Court and the parties have no way of knowing whether the District Court considered the critical limitation of the claim in relation to Sears and Bacon; the only evidence available is the District Court’s opinion which indicates that the Court overlooked that the critical limitation of the claim distinguishes over Sears and Bacon.

9. While under the authorities this Court might remand the case to the District Court for compliance with Civil Rule 52(a) the record on the merits is so clear in appellants' favor that this Court can finally resolve the question of the patentability of claim 2 without remand.

10. This case is one in which there is no presumption of correctness of the decision below.

11. The phenomenal acceptance of the Murton ladle stopper throughout the world, satisfying an old and recognized want, is evidence of unobviousness and invention.

ARGUMENT

All evidence in the case is undisputed. The only two witnesses were Sergy, appellants' expert witness, and Harley, president of appellant Vesuvius Crucible Company.

Since all evidence is undisputed much of appellants' argument — that part having to do with the facts of the case — is contained in the Statement of the Case section of this brief. To avoid duplication we shall, when our argument includes reference to undisputed facts set forth in the Statement of the Case section of this brief, simply refer thereto.

This argument follows the eleven numbered paragraphs in the Summary of Argument section of this brief.

1.

The problem faced by Murton is fully explained at pages 5 - 7, *supra*. The existence of the problem is undisputed.

Also the fact that Murton solved the problem is not disputed. The District Court referred to Murton's construction as an "advantageous construction" (JA 174) and described the advantage as follows (JA 173-4):

"The plaintiffs relied before the Court and in their brief primarily upon a superior function of their device. Considerable testimony and argument was devoted to showing the advantage of having the refractory sleeves (which are positioned above the stopper head) bear on the surface of the insert rather than the surface of the stopper head. The advantage accruing from such a construction was said to be the removal of stress from the narrow side walls of the stopper head, thus reducing the likeli-

Critical Limitation Characterizes Murton's Invention. 21

hood of failure of the stopper head during its performance."

Murton's solution reduced stopper head failure from 10% to less than 3% (JA 21).

2.

Murton's solution to the problem is fully described in undisputed testimony marshalled at pages 7 - 9, *supra*.

3.

Sergy explained the advantage of the insert being "the sole means overlying the lateral projection at the bottom of the rod", saying (JA 26),

"The fact that it [the insert] is also free, has free access from above also insures the fact that the thrust of the sleeves downwardly is transmitted through the insert to the rod flange."

Sergy further testified (JA 32):

"Q. Does the Murton ladle stopper as claimed in the application at bar produce 'new and useful results never before attained'? A. Yes, it does.

"Murton's insert has no equivalent in the references cited, and it makes possible the relieving of the stress imposed by the sleeves. It makes possible the use of an insert which transmits this thrust downwardly to a flange on the rod, thereby freeing the head of any thrust and thereby greatly improving the chances of not having head failure."

The critical limitation above referred to which appears at the end of the claim properly characterizes Murton's invention, being responsible for the new and useful results accomplished by the Murton ladle stopper.

4.

The claim is not anticipated by any of the three references.

The British Patent

As the District Court held, the claim in issue distinguishes from the British patent by the critical limitation at the end of the claim (JA 175). The portion of the head D of the British patent to the right of the rod in Fig. 5 overlies the rod flange F and positively prevents the thrust of the sleeves from being transmitted to the rod flange through the insert (JA 157; p. 14, *supra*) since the bottom of the bottom sleeve upon downward movement of the sleeves encounters and comes to rest on that portion of the head.

Sears

Sears is in exactly the same category as the British patent in that if the plate 29 (JA 147, 180) is called the insert in accordance with the Examiner's Answer (JA 121) it is not the sole means overlying the rod flange 34. The portion of the head 25 indicated at Y (JA 180) overlies the rod flange. The sleeves 21 cannot bear on the rod flange. They bear on the upper thin wall portion of the head.

It is also pointed out that Sears's plate 29 is not "inserted downwardly into the well" as the claim specifies. Sears's head or needle tip 25 is of clay and is molded about the plate 29 when the clay is green (JA 150, col. 2 ll. 86 ff.), which is the only possible way of getting the plate into the head (JA 28). The District Court recognized this and held (JA 174-5):

"It appears to the Court that either the plate (29) or the opening (28) in Sears could easily be fashioned,

if it were desired to do so, so that the plate could be inserted downwardly through the opening into the well. To merely do this would not appear to rise to the level of invention."

Yet the Court did not suggest how to "fashion" the parts to adapt them for such mode of assembly or cite any teaching in the prior art leading to that result. Such a "hindsight" rejection is untenable and directly violates the rule enounced by the same judge (Jackson, J.) less than eight months earlier in *United Merchants and Manufacturers, Inc. v. Ladd*, 223 F.S. 98, 99. Also in point are *In re Deakins*, 96 F.2d 845, 849, 25 CCPA 1153, 1157; *In re Leschinsky*, 123 F.2d 645, 647, 29 CCPA 736, 739-40.

Bacon

Likewise in Bacon if the pin 2 is called the flange and the channels 9 the insert as the examiner did (JA 120) the portion X of the head (JA 179) overlies the flange, blocking any possibility of the sleeves 4 (JA 153) seating on the flange.

Respecting Bacon the District Court in dealing with the limitation of the claims that the insert is "inserted downwardly into the well" said (JA 175):

"In any event, it is admitted that the elements 9 of Bacon can be inserted downwardly through the well opening and into position above the upper face of the protuberance (2) at the bottom of the rod. This seems sufficient to meet the broad requirements of the claims."

In this the Court erred. The undisputed testimony is that the elements 9 of Bacon cannot be so inserted (JA 29, 34).

24 *Sleeves Properly Not Recited in Murton's Claims.*

5.

The rod protecting sleeves are not recited in the claim as they are not part of the stopper per se. The stopper structure claimed has the *advantage* of supporting rod-protecting sleeves free of bearing on the top of the stopper head; i.e., the claimed structure insures positioning of the insert fully exposed upwardly of the well so that rod-protecting sleeves above the head can bear upon it. See Sergy's testimony quoted at page 12, *supra*.

The fact that the sleeves are not recited in the claims seems to have been regarded by the District Court as a factor adverse to Murton. The Court said (JA 174):

"This advantageous construction, however, does not appear to be directly set forth in the specification, and is certainly not recited by the claims. In view of this, the extensive arguments on this point may only be accorded slight probative weight."

The District Court further said (JA 175-6):

"Finally, the plaintiffs rely upon proof of commercial success to show unobviousness. The Court is not convinced, however, that the commercial success the plaintiffs have enjoyed can be attributed to the claims before the Court. The feature which has produced the commercial success is apparently the manner in which refractory sleeves rest upon the stopper head assembly. Since the claims do not require that the sleeves rest upon the insert, the commercial success arising from such a construction cannot be given weight in determining obviousness."

This is submitted to be flagrant error. The advantages and commercial success of Murton's ladle stopper derive from the *claimed structure*.

The District Court's reasoning is analogous to holding that the advantages and commercial success of an improved ball point pen which writes without skipping cannot be attributed to the patented pen because the paper on which the pen writes is not included as an element of the patent claim.

The law is well settled that additional elements whereby advantages of an invention are obtained or indeed which are necessary to render the invention operative need not be set forth in the claim. The leading case is *Deering v. Winona Harvester Works*, 155 U.S. 286, in which the Supreme Court held (p. 302):

"Admitting that additional elements are necessary to render the device operative, it does not necessarily follow that the omission of these elements invalidates the claim, or that the precise elements described in the patent as rendering it operative must be read into the claim. If Steward were in fact the first to invent the pivotal extension to a butt-adjuster, he is entitled to a patent therefor, though the infringer may make use of other means than those employed by him to operate it. *Loom Company v. Higgins*, 105 U.S. 580, 584. In such case any appropriate means for making it operative will be understood. Otherwise the infringer might take the most important part of a new invention and, by changing the method of adapting it to the machine to which it is an improvement, avoid the charge of infringement. The invention of a needle with the eye near the point is the basis of all the sewing machines used; but the methods of operating such a needle are many, and if Howe had been obliged to make his own method a part of every claim in which the needle was an element, his patent would have been practically worthless. We think it sufficiently appears that Steward was the inventor of the pivoted extension described in the twentieth claim; that the claim is valid, and was infringed by the defendants."

The United States Court of Appeals for the Second Circuit, relying on the *Deering* case, said in *Stiegele et al. v. J. M. Moore Import-Export Co., Inc., et al.*, 312 F.2d 588, 591:

"The omission of an element necessary to the operation of an invention must be distinguished from the omission of an element which is a part of the invention itself. The former is not fatal."

In the present case the sleeves, as disclosed by the references (JA 147, 153, 160) are conventional elements of the art. They are not part of the ladle stopper per se. The novel ladle stopper structure accepts the downward thrust of the sleeves and relieves the thin upper wall portion of the stopper head of stress, minimizing stopper head failure.

6.

The history of the critical limitation of the claim in issue is factual and is fully set forth at pages 12 - 3, *supra*.

7.

Especial emphasis is placed on this section of appellants' argument.

In the Patent Office the critical limitation of the claim in issue — that the insert is "the sole means overlying the lateral projection at the bottom of the rod" — was never appreciated or even recognized. The application as filed contained ten claims (JA 81) of which only claims 1 and 2 contained the critical limitation (JA 82). Three claims — Nos. 11-13 — were added (JA 83), claim 8 was allowed (JA 89), claims 1, 3, 4, 6, 10 and 11 were cancelled (JA 95) and claims 2, 5, 7, 9, 12 and 13 were appealed (JA 96). In the District Court all rejected claims except claim 2 were withdrawn (JA 178).

For the most part the Patent Office examiner treated the claims in groups (JA 81, 83-4, 89, 90), never recognizing the presence of the critical limitation in claim 2, which is the sole claim now in issue (allowed claim 8 is not in issue).

The Court's attention is directed specifically to the Examiner's Answer (JA 120-3) because the District Court

" after thoroughly reviewing all three different contentions of the Patent Office determined that the analysis by the Examiner in his Answer was correct" (JA 174, page 13, *supra*).

It will be seen that the critical limitation of claim 2 was completely "lost in the shuffle". The rejection in the Examiner's Answer (JA 122-3) was a rejection of claims 2, 5, 7, 9, 12 and 13 as a group, the examiner being oblivious of the presence in claim 2 of the critical limitation.

Thus the examiner's "analysis" which the District Court followed overlooked entirely the issue now before this Court as to the effect of the critical limitation.

Referring now to the District Court's opinion, the District Court affirmed the examiner's rejection of all six claims, and attention is directed to the fact that the District Court did not mention specifically a single one of Murton's claims until the very last sentence of the discussion of the claims and references, which last sentence reads as follows (JA 175):

"It does seem, however, that this reference [the British patent] might be avoided with respect to Claim 2 by that claim's requirement that the insert be the 'sole means overlying the lateral projection at the bottom of the rod'".

This statement appears to have been an afterthought, as though the Court discovered the limitation in the claim when putting the finishing touches on the opinion.

There is no indication that the District Court looked back over the Sears and Bacon patents to determine whether the limitation discovered in claim 2 might not also distinguish from Sears and Bacon. We submit that had that been done the claim would or should have been found allowable.

8.

The District Court did not comply with Civil Rule 52(a) requiring that the trial court in non-jury cases "shall find the facts specially and state separately its conclusions of law thereon".

The crux of this case is whether the critical limitation of the claim distinguishes over Sears and Bacon. The District Court recognized that such limitation distinguishes over the British patent but gave no indication that the limitation had been considered in relation to Sears and Bacon or, if it had, whether or not it was deemed to distinguish over those references. As indicated above (page 27 and this page), it appears on the face of the District Court's opinion that the Court, considering all the claims as a group and unaware of the critical limitation of claim 2, decided that the claims were unpatentable over the references and subsequently discovered the critical limitation in claim 2 and the fact that it distinguishes from the British patent but did not look back to Sears and Bacon to find that the critical limitation distinguishes from those references in the same way as it distinguishes from the British patent.

It is submitted that the least that appellants are entitled to is consideration of claim 2 in relation to Sears and Bacon. Such consideration will result, we are confident, in an ultimate holding that the claim is patentable.

The applicable law is well settled in this Court and elsewhere. The leading case in this Court, also a patent case, is *Polaroid Corporation et al. v. Markham et al.*, 80 U.S. App. D.C. 225, 226, 151 F.2d 89, 90:

"Reports of testimony, without more, are not adequate findings of fact. Since operativeness, reduction to practice, and priority of invention are questions of fact, it was error to designate findings on these matters as conclusions of law. This error would be largely formal, and probably would not require a remand, if we could get a clear understanding of the basis of the court's judgment. Cf. *Minnesota Mining & Mfg. Co. v. Coe*, 75 U.S.App.D.C. 131, 125 F.2d 198. But we cannot tell, from the findings and conclusions, whether the court disbelieved the uncontradicted testimony of appellants' witnesses or whether it considered that this testimony though true failed for some reason or reasons of law to establish inoperativeness and reduction to practice. The record of the proceedings in the Patent Office does not help us; no evidence was offered there on the issue of inoperativeness, and on the issue of reduction to practice the appellants presented considerable additional evidence in the District Court. Accordingly we must set aside the judgment and remand the case for a fuller compliance with the requirement of Federal Rules of Civil Procedure, Rule 52(a) that the court 'find the facts specially and state separately its conclusions of law thereon * * *'. Cf. *United States v. Esnault-Pelterie*, 299 U.S. 201, 57 S.Ct. 159, 81 L.Ed. 123; *Interstate Circuit, Inc. v. United States*, 304 U.S. 55, 58 S.Ct. 768, 82 L.Ed. 1146; *Saginaw Broadcasting Co. v. Federal Communications Commission*, 68 App.D.C. 282, 287, 96 F.2d 554.

"Remanded."

Interstate Circuit, Inc., et al. v. United States, 304 U.S. 55, cited by this Court in the *Polaroid* case, was a case under former Equity Rule 70½ which was superseded by Civil Rule 52(a), the pertinent language being identical in the two rules. The Supreme Court held (pp. 56-7):

"The District Court did not comply with this rule. The court made no formal findings. The court did not find the facts specially and state separately its conclusions of law as the rule required. The statements in the decree that in making the restrictive agreements the parties had engaged in an illegal conspiracy were but ultimate conclusions and did not dispense with the necessity of properly formulating the underlying findings of fact.

"The opinion of the court was not a substitute for the required findings. A discussion of portions of the evidence and the court's reasoning in its opinion do not constitute the special and formal findings by which it is the duty of the court appropriately and specifically to determine all the issues which the case presents. This is an essential aid to the appellate court in reviewing an equity case (*Railroad Commission v. Maxcy*, 281 U. S. 82, and cases cited)."

The reasoning underlying the rule is well stated by this Court in *Saginaw Broadcasting Co. v. Federal Communications Commission*, 68 U.S. App D.C. 282, 287, 96 F.2d 554, 559:

"The requirement that courts, and commissions acting in a quasi-judicial capacity, shall make findings of fact, is a means provided by Congress for guaranteeing that cases shall be decided according to the evidence and the law, rather than arbitrarily or from extralegal considerations; and findings of fact serve the additional purpose, where provisions for review are made, of apprising the parties and the reviewing tribunal of the factual basis of the action of the court or commission, so

that the parties and the reviewing tribunal may determine whether the case has been decided upon the evidence and the law or, on the contrary, upon arbitrary or extralegal considerations. When a decision is accompanied by findings of fact, the reviewing court can decide whether the decision reached by the court or commission follows as a matter of law from the facts stated as its basis, and also whether the facts so stated have any substantial support in the evidence. In the absence of findings of fact the reviewing tribunal can determine neither of these things. The requirement of findings is thus far from a technicality. On the contrary, it is to insure against Star Chamber methods, to make certain that justice shall be administered according to facts and law."

9.

In the present case, although the District Court did not consider the claim in relation to Sears and Bacon, it did clearly evidence an appreciation of the critical limitation (JA 175; pages 13, 14, *supra*) and the structures of Sears and Bacon are so clear on the face of the record (JA 179-80) that it is believed that under this Court's reasoning in the *Polaroid* case, *supra*, a remand is not necessary and this Court can correct the error. In *Polaroid* this Court said that the error of the trial court:

"... probably would not require a remand, if we could get a clear understanding of the basis of the court's judgment." (page 29, *supra*).

We therefore request that this Court correct the District Court's error and direct the allowance of Murton's Claim 2.

10.

There is no presumption of correctness of the decision below. Indeed there was no such presumption in the District Court because of the disparity between the holdings of the examiner and the Board of Appeals (JA 169-73). In *General Tire and Rubber Company et al. v. Watson*, 184 F.S. 344, the United States District Court for the District of Columbia held (p. 346):

"The significance of this history of the application in the Patent Office is that unlike the great majority of the cases from the Patent Office that come before this Court, there was no unanimity among the Patent Office tribunals but there was a difference of opinion as between two of the examiners and the action of one of them was ultimately affirmed by the Board of Appeals. Consequently, this matter does not come before this Court in a manner requiring the same weight to be attached to the action of Patent Office authorities as when they are all in accord."

The situation here is stronger for Murton than the *General Tire* case was for the applicant there, as here the Board did not agree with but repudiated the examiner's reasoning (JA 34). The present case becomes even stronger for Murton because the defendant assumed before the District Court a position differing from both that of the examiner and that of the Board of Appeals (JA 173, page 13, *supra*).

Moreover, in the present case Sergy's testimony contained uncontradicted evidence of patentability which was not presented to the Patent Office. This Court said in *Stradar et al. v. Watson*, 100 U.S. App. D.C. 289, 291, 244 F.2d 737, 739:

"It should be noted, however, that at the hearing in the District Court the appellants introduced material evidence tending to show patentability

Phenomenal Acceptance of Murton's Invention. 33

over the Hickman references. This proof, which will be noticed later in this opinion, was not contradicted and contained information which was not presented to the Patent Office. That being true, the District Court was not controlled by the presumption of correctness which attaches to Patent Office action, but was free to reach its own conclusion on the basis of the fuller information which was before it."

The Court's attention is also drawn to Syllabus 5 of its decision in *Poulsen et al. v. Coe*, 73 U.S. App. D.C. 324, 119 F.2d 188:

"Where the findings and conclusions of the trial court and the rulings of the Patent Office are in clear error on the question of anticipation of certain claims the patentability of which is in issue, and where it is clear that the advance contained in such claims is inventive in character, such determinations by the trial court and the Patent Office must be reversed."

The *Poulsen* case is submitted to be squarely in point here.

11.

Up to the time of the trial (December 18, 1963) about 1,500,000 Murton ladle stopper heads having a sales value of over \$5,000,000 were sold (JA 57). Over 275,000,000 tons of molten steel have been teemed through ladles equipped with Murton stoppers (JA 57).

The impact which the Murton invention has made on the steel industry is evidenced by the fact that at the time of the trial between 75% and 80% of all steel ingot tonnage produced in the United States was being teemed by the use of ladles equipped with the Murton ladle stopper (JA 57). All of the principal steel producers in the United States use the Murton stopper (JA 58).

Murton ladle stoppers are sold to customers in Australia, Belgium, Brazil, Chile, Canada, France, West Germany, Holland, Italy, Japan, Luxembourg, Mexico, Peru, Singapore, Republic of South Africa and the United Kingdom (JA 59). The Murton stopper is used by an imposing list of foreign steel producers (JA 59-60).

Plaintiff Vesuvius Crucible Company has been approached by refractories manufacturers in the United States and many foreign countries seeking licenses. Some are listed at JA 61-2. Vesuvius has filed patent applications corresponding to the Murton application here in issue in all of the principal steel producing countries of the world except those behind the iron curtain (JA 60). Many patents have issued, although a number of the patent applications were still pending at the time of the trial. Only one had been refused—in Austria, because the application in that country was not filed until after the publication of the Murton patent specification in the United Kingdom; under Austrian law the publication of the corresponding specification in the United Kingdom constituted a bar (JA 60).

Of the refractories manufacturers who have sought licenses from Vesuvius only one—Lava Crucible-Refractories Co.—has been licensed (JA 62). The Lava license provides for a royalty of 15% of the net sales price which to the time of the trial amounted to over \$75,000.00 (JA 62).

Vesuvius is planning to supply the European market by its own manufacturing plant in Scotland. It purchased a plant in Scotland which at the time of the trial was being equipped and was scheduled to begin production in May, 1964, with a capacity of 600,000 ladle stoppers per year (JA 62). The outlay for that plant is \$350,000.00 (JA 63).

To assist in supplying the European market Mr. Murton has been living in Germany since January, 1962, to demonstrate the Murton ladle stopper and assist European steel manufacturers in putting it into use (JA 63).

Steel producers in the United Kingdom, Holland, West Germany and France are paying from two to five times more for the Murton stoppers than they previously paid for stoppers available prior to the Murton invention (JA 63). The increased cost is offset by the increased operating economy (JA 63-4).

It is not exaggeration to say that the Murton ladle stopper has revolutionized the production of steel ingots throughout the world.

The success of the Murton invention was recognized by the District Court whose opinion states (JA 175):

"The feature which has produced the commercial success is apparently the manner in which refractory sleeves rest upon the stopper head assembly."

This is due to the structure specifically defined by the claim in issue (page 10, *supra*).

The law is well settled, especially in this circuit, that satisfaction by a method or device of an old and recognized want is highly persuasive of invention. This Court held in *Levin v. Coe*, 76 U.S. App. D.C. 347, 354-5, 132 F.2d 589, 596-7:

"In *Carbide and Carbon Chemicals Corporation v. Coe*, 1938, 69 App. D.C. 372, 102 F.2d 236, and again in *Thornton v. Coe*, 1938, 69 App. D.C. 383, 102 F.2d 247, we recognized the principle that satisfaction by a method or device of an old and recognized want is highly persuasive of invention. The basis of that doctrine is that otherwise the mere skill of the art would normally have been

called into action by the known want. The doctrine is authenticated by leading cases too numerous to mention. We cited them in the two cases just referred to. It is also settled in the law of patents that the fact that all of the elements entering into a combination are old does not necessarily negative the existence of invention. *Diamond Rubber Co. v. Consolidated Rubber Tire Co.*, 1911, 220 U.S. 428, 31 S. Ct. 444, 55 L.Ed. 527; *Iron Fireman Mfg. Co. v. Industrial Engineering Corp.*, 7 Cir, 1937, 89 F.2d 904. Such a combination may be patentable invention if it produces a new result, or an old result in a new or more efficient way. *Independent Oil Well Cementing Co. v. Halliburton*, 10 Cir., 1932, 54 F.2d 900, certiorari denied, 1932, 286 U.S. 544, 52 S. Ct. 496, 76 L.Ed. 1281; *N. O. Nelson Mfg. Co. v. F. E. Myers & Bro. Co.*, 1928, 25 F.2d 659, certiorari denied, 1932, 287 U.S. 617, 53 S. Ct. 18, 77 L.Ed. 536; see *Walker on Patents* (Deller's ed. 1937) 147-149. The fact that the combination later appears to be a simple one does not necessarily negative the presence of a high degree of inventive genius. *Loom Company v. Higgins*, 1881, 105 U.S. 580, 26 L.Ed. 1177; *Diamond Rubber Co. v. Consolidated Rubber Tire Co.*, supra. We recognized these principles in *Electrons, Inc., v. Coe*, 1938, 69 App. D.C. 181, 99 F.2d 414."

Finally, in rebuttal of the District Court's holding that Murton's ladle stopper simply involves obvious modifications of *Sears and Bacon* (pages 22-3, supra), reference is made to this Court's statement of the law in *L-O-F Glass Fibers Company et al. v. Watson*, 97 U.S. App. D.C. 69, 72, 228 F.2d 40, 43:

"... invention is not to be denied simply because, when 'Viewed after the event, the means ... [may] seem simple and such as should have been obvious to those who worked in the field ...' *Good-year Tire Rubber Co. v. Ray-O-Vac Co.*, 1944, 321 U.S. 275, 279, 64 S. Ct. 593, 594, 88 L.Ed. 721."

See also the authorities cited at page 23, supra.

CONCLUSION

It is submitted that on the record the appellants are entitled to a mandate to the District Court to enter a final judgment that claim 2 of the Murton application is patentable and that Vesuvius is entitled to receive a patent thereon and authorizing defendant to issue such patent on compliance with the requirements of law, or at least a remand to the District Court with instructions to comply with Civil Rule 52(a).

Respectfully submitted,

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February 8, 1965.

BRIEF FOR APPELLEE

IN THE
United States Court of Appeals
FOR THE DISTRICT OF COLUMBIA CIRCUIT

Appeal No. 19,083

CRAWFORD B. MURTON AND VESUVIUS CRUCIBLE
COMPANY, APPELLANTS

v.

DAVID L. LADD, COMMISSIONER OF PATENTS, APPELLEE

Appeal from the Judgment of the United States
District Court for the District of Columbia

United States Court of Appeals
for the District of Columbia Circuit

FILED MAR 12 1965

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APPEAL NO. 19,083

STATEMENT OF QUESTIONS PRESENTED

1. Where appellants' new evidence before the District Court establishes that a specific structure is a critical and essential portion of their invention in fact, and where that specific structure is not defined in claim 2 on appeal, is patenting of that claim precluded by 35 U.S.C. 112?

2. The Board of Appeals having found the substance of claim 2 obvious to one skilled in the art in view of the Sears patent, and the District Court not having found error in the finding, is that finding inconsistent with all the evidence before the District Court in the sense of *Abbott v. Coe*, 71 App. D.C. 195, 109 F.2d 449?

3. Would the subject matter of appellants' claim 2 be obvious to one skilled in the art in view of each of the patents cited by the Examiner taken individually?

4. Is patenting of claim 2 precluded by 35 U.S.C. 112 where the claims fails to define various features of the invention shown to be essential by an expert's affidavit in the application file?

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IN THE
United States Court of Appeals
FOR THE DISTRICT OF COLUMBIA CIRCUIT

Appeal No. 19,083

CRAWFORD B. MURTON AND VESUVIUS CRUCIBLE
COMPANY, APPELLANTS

v.

DAVID L. LADD, COMMISSIONER OF PATENTS, APPELLEE

Appeal from the Judgment of the United States
District Court for the District of Columbia

BRIEF FOR APPELLEE

INTRODUCTION

This is an appeal from the judgment (J.A. 177) of the United States District Court for the District of Columbia dismissing the complaint (J.A. 3) in an action brought under 35 U.S.C. 145.

In that action, appellants, respectively as applicant and assignee of an application for patent (J.A. 65)

entitled "Stopper for a Ladle or Similar Receptacle", Serial No. 759,670, filed September 8, 1958, sought to have the Court authorize the issuance on said application of a patent containing claims 2, 5, 7, 9, 12 and 13 (J.A. 4) of said application. Claim 8 (J.A. 4) of the application has been allowed by the Examiner in the Patent Office. No other claims remain in the application.

The Examiner in the Patent Office refused allowance (J.A. 89, 120) of claims 2, 5, 7, 9, 12 and 13 of said application on the ground of unpatentability over a British patent to Williams *et al.* (J.A. 159), a patent to Bacon (J.A. 153), and a patent to Sears (J.A. 147) taken individually.

The Patent Office Board of Appeals affirmed (J.A. 140) the Examiner's refusal of said claims without reversing any ground of rejection and with express discussion of only the Sears and Bacon patents.

At the trial in the District Court, appellants took testimony as to each of the six refused claims (J.A. 36 and 39 through 41). The District Court found all of those claims unpatentable (J.A. 167, 176) over each of the Sears and Bacon patents taken individually and all of those claims, except possibly claim 2, unpatentable over the British patent to Williams *et al.* The Court entered judgment dismissing the complaint (J.A. 177). Then appellants petitioned for reconsideration as to claim 2 (J.A. 178), belatedly purported to withdraw their complaint as to all claims except claim 2 (J.A. 178), and asked for a new judgment (J.A. 178). The petition was opposed by appellee and denied by the District Court (J.A. 190).

Appellants' statement that all claims except claim 2 were withdrawn in the District Court (Brief, pp. 14, 26) must be read in the foregoing context.

THE PRIOR ART

Prior to appellant Murton's invention there were in use stoppers for ladles containing as much as 350 tons of molten steel at 2900°F.. Prior conventional ladle stoppers comprise a metal stopper rod to the lower end of which a refractory stopper head is attached. Above the head, a column of refractory sleeves protects the rod from the heat of the molten metal. (Bacon patent, J.A. 153, Fig. 1; J.A. 31, last 11 lines).

Appellants' application admits prior art as follows (J.A. 65):

* * * Many different proposals have been made for fastening stopper rods to stopper heads but each has had disadvantages. It is undesirable to apply the stopper rod through the bottom of the stopper head as then the opening in the bottom of the stopper head must be plugged and the plug is liable to fall out. Various provisions for applying the stopper rod to the top of the stopper head have been suggested but these have for the most part involved intricate or impractical structures. They have generally involved so-called "one piece" or permanently assembled stopper rod and head combinations requiring breaking the stopper head to disconnect the rod from the head for replacement of one or the other.

The disclosures of the Williams et al. British patent No. 12,291 of 1904 (J.A. 157), the Bacon patent No. 1,719,795 (J.A. 153), and the Sears patent No. 1,843,175 (J.A. 147) are adequately summarized by the District Court in its opinion (J.A. 170).

APPELLANTS' APPLICATION

Appellants' application (J.A. 65) discloses two specific structural embodiments of an improvement in a stopper head unit attached to the rod of a stopper assembly.

One of appellants' disclosed embodiments (Fig. 6, J.A. 79) involves a refractory stopper head having a thick bottom portion and containing a generally cylindrical concentric well having threaded interior walls. The stopper rod has a projection in the form of a concentric circular flange at its lower end. Both the rod and the flange have diameters smaller than that of the well. A hollow cylindrical exteriorly threaded refractory insert member of considerable wall thickness is assembled on the rod so that it surrounds it and is in contact with the flange. The insert is screwed into the interiorly threaded well to fasten the head on the stopper rod and substantially to fill the space between the well-wall and the rod. The insert may be made in two halves or in one piece. Allowed claim 8 is readable on this embodiment.

The other embodiment (Figures 1 through 5, J.A. 75, 77) involves a refractory stopper head having a thick bottom portion and containing a concentric well which has a cylindrical lower portion of diameter

greater than that of the cylindrical upper portion. A horizontal shoulder results between those portions. The wall of the upper portion has diametrically opposite wide vertical grooves of a depth such that their back wall is a vertical extension of the cylindrical wall of the lower portion of the well. The stopper rod has at its lower end a concentric circular horizontal flange. Both the rod and the flange are of a diameter smaller than that of the upper part of the well so that they are readily inserted downwardly into the well. A hollow cylindrical refractory insert member of considerable wall thickness is adapted to surround the rod and rest on the rod flange. The insert member has diametrically opposite lugs such that they fit complementarily in the opposite grooves of the upper portion of the well. The insert can thus be assembled on the rod to overlie the flange and be inserted downwardly into the well, with the lugs passing through the vertical grooves in the upper wall of the well. Upon turning of the insert, the lugs pass under the horizontal shoulder to lock the head on the rod as in any conventional bayonet fastening. Keepers are then inserted to fill the vertical grooves and hold the insert lugs in their locking position. The insert substantially fills the space between the smaller-diameter well-wall and the rod.

In the specification of appellants' application it is stated that appellants' stopper is "very easy to assemble and disassemble, is inexpensive and gives long service life" (J.A. 72).

STATUTES (35 U.S.C.)

§ 102. Conditions for patentability; novelty and loss of right to patent

A person shall be entitled to a patent unless—

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or

(c) he has abandoned the invention, or

(d) the invention was first patented or caused to be patented by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application filed more than twelve months before the filing of the application in the United States, or

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or

(f) he did not himself invent the subject matter sought to be patented, or

(g) before the applicant's invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it. In determining priority of invention there shall be considered

not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other.

Notes—Section 4(b) of the Act of July 19, 1952 provides:

“Section 102(d) of Title 35, as enacted by section 1 hereof, shall not apply to existing patents and pending applications, but the law previously in effect, namely the first paragraph of R. S. 4887 (U.S. Code, title 35, sec. 32, first paragraph, 1946 ed.), shall apply to such patents and applications.”

Section 4(d) of the Act of July 19, 1952 provides:

“The period of one year specified in section 102(b) of Title 35 as enacted by section 1 hereof shall not apply in the case of applications filed before August 5, 1940, and patents granted on such applications, and with respect to such applications and patents, said period is two years instead of one year.”

§ 103. Conditions for patentability; non-obvious subject matter

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which

said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

§ 112. Specification

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

SUMMARY OF ARGUMENT

At the trial in the District Court, appellants by their new evidence in the form of the testimony of a witness disclosed for the first time in the history of the prosecution of their patent application that their invention in fact lies in a special use of their dis-

closed structure to provide a special advantage which is critical and essential in their invention. Neither the special use nor the special advantage is disclosed in the application. Neither the special use nor the advantage nor the disclosed structure necessary to such use and advantage is defined in claim 2 on appeal. Accordingly, the claim does not point out and distinctly claim what appellants regard as their invention and 35 U.S.C. 112 precludes patenting.

The substance of claim 2 is unpatentable as obvious to one skilled in the art in view of each one of three prior patents cited by the Examiner. The finding of the Board of Appeals as to obviousness in view of the Sears patent is clearly entitled to the presumption of correctness of *Abbott et al. v. Coe*, 71 App. D.C. 195, 109 F.2d 449, and is not inconsistent with all the evidence before the District Court.

Claim 2 is further unpatentable under 35 U.S.C. 112 for failure to define essential features of the invention pointed out in an expert's affidavit in the application.

ARGUMENT

Appellants' evidence as to the actual invention in commercial success

At pages 7 through 9 of their brief before this Court, appellants stress *their evidence* as to what *in fact* is their *invention in commercial success*. Specifically they state (page 7):

Murton relieves the upper thin wall portion of the stopper head of the downward thrust of the rod protecting sleeves when the stopper is

jammed down into the nozzle of the ladle to shut off the flow of molten steel from the ladle, thus eliminating the *primary source* of stopper head failure (J.A. 48-9). (emphasis added)

At page 8 of their brief, appellants further quote the witness Sergy (J.A. 21) as follows:

Murton differs from the references cited, and he differs in an *important and critical manner*.
* * * The weight of the sleeves is carried by the insert, and *the thrust of the sleeves is transmitted through the insert to the rod flange*. It frees the head of any such stress and there is less danger of head failure. (emphasis added)

The function of transmitting the sleeve thrust through the insert to the rod flange is not described in the specification of the instant application, is not inherent in either the structure described in the specification or the structure disclosed in the drawings, and was never mentioned to the Patent Office by the appellants in any paper in the file of the instant application. (See particularly the briefs before the Board of Appeals, J.A. 103 and 124).

In appellants' stopper head of Figures 1 through 5 of their application (J.A. 75, 77), no sleeve is shown and the top of the insert is shown flush with the top of the stopper head walls. The specification contains no description of the structural relationship of sleeves to the head of Figures 1 through 5.

The application in the embodiment of Fig. 6 of the drawings (J.A. 79) discloses a rod protecting sleeve. As to that sleeve the specification states only that it may be "of conventional form." The form shown in

Fig. 6 corresponds to that shown in Fig. 2 of the Sears patent (J.A. 147). The insert of Figure 6 in assembled position presents a frusto-conical projection above the top of the stopper head. Fig. 6 shows the lowest sleeve of a conventional column of sleeves as bearing *only on the conical surfaces* of the top end portion of the externally threaded insert. Also, in Figure 6, the insert is shown threaded into the headwell but *out of contact with the rod flange* so that on downward thrust of the stopper any sleeve load carried by the insert is transmitted through the wall-thread and *through the wall* to the bottom of the head. There is clearly no disclosure in Figure 6 of transmittal of sleeve load *through the inserts to the rod flange*.

**Unpatenability of claim 2 for failure to claim
the critical features of the actual invention**

Having not disclosed their advantage in an undisclosed function of their structure in an undisclosed specific use, appellants contend at page 10 of their brief as follows:

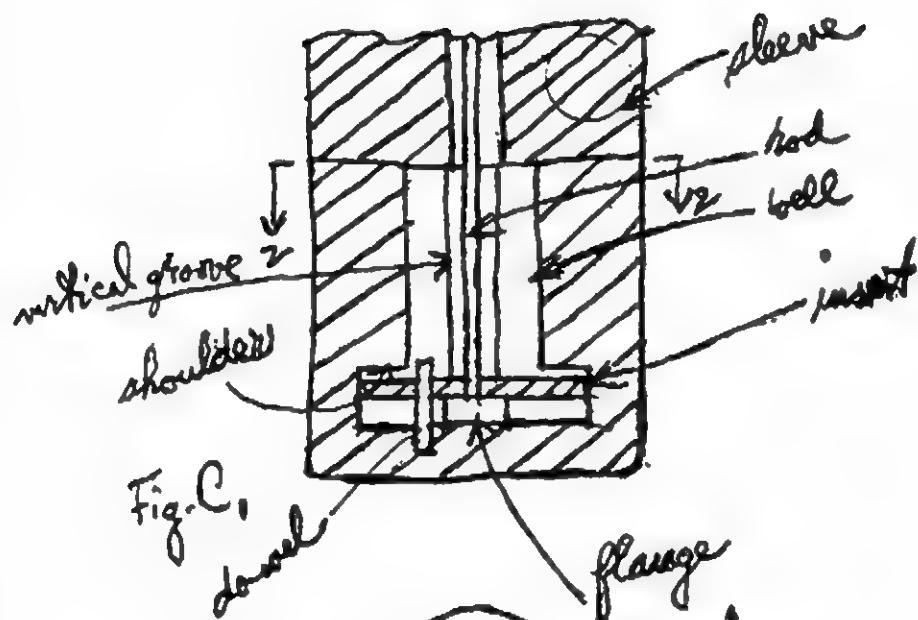
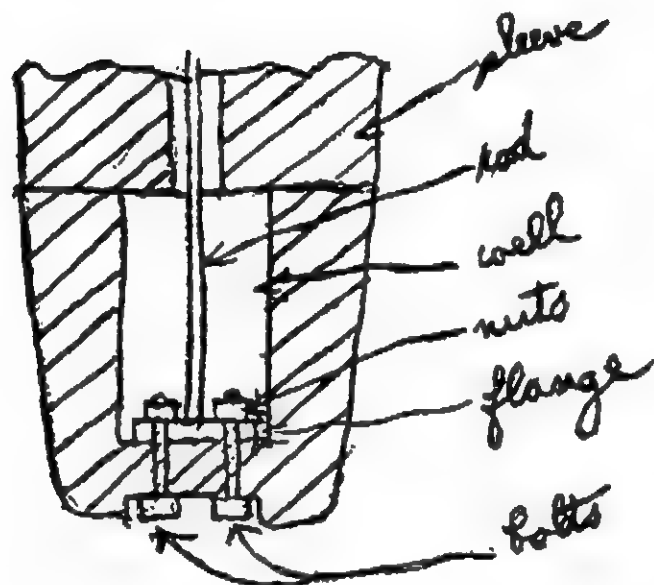
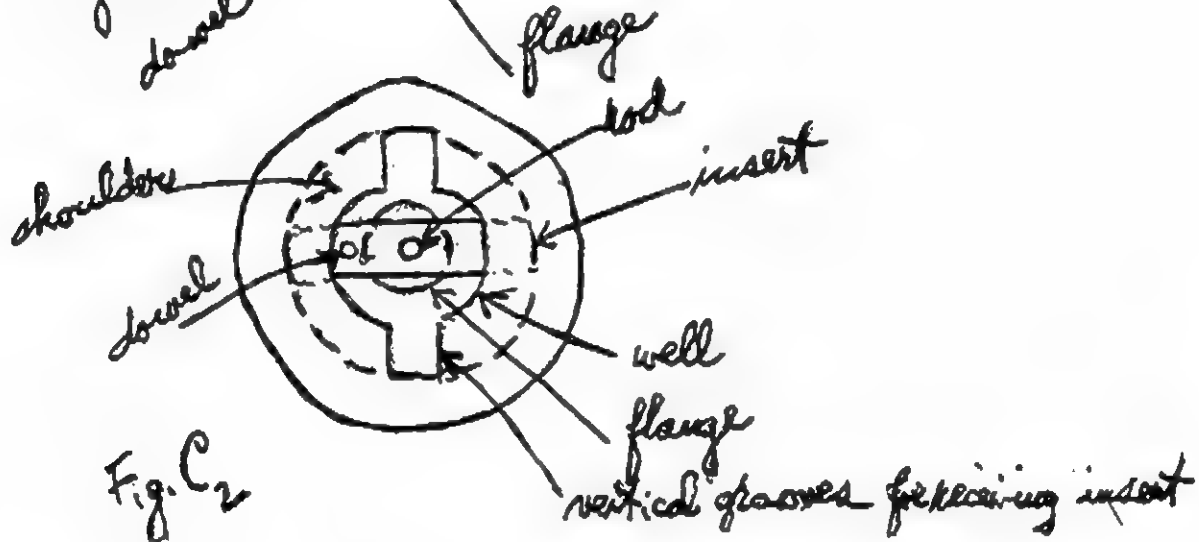
The focal point of this case is the last clause of claim 2: "said means [the insert 9 of Figs. 1-5 or 9a of Fig. 6] being the sole means overlying the lateral projection at the bottom of the rod."

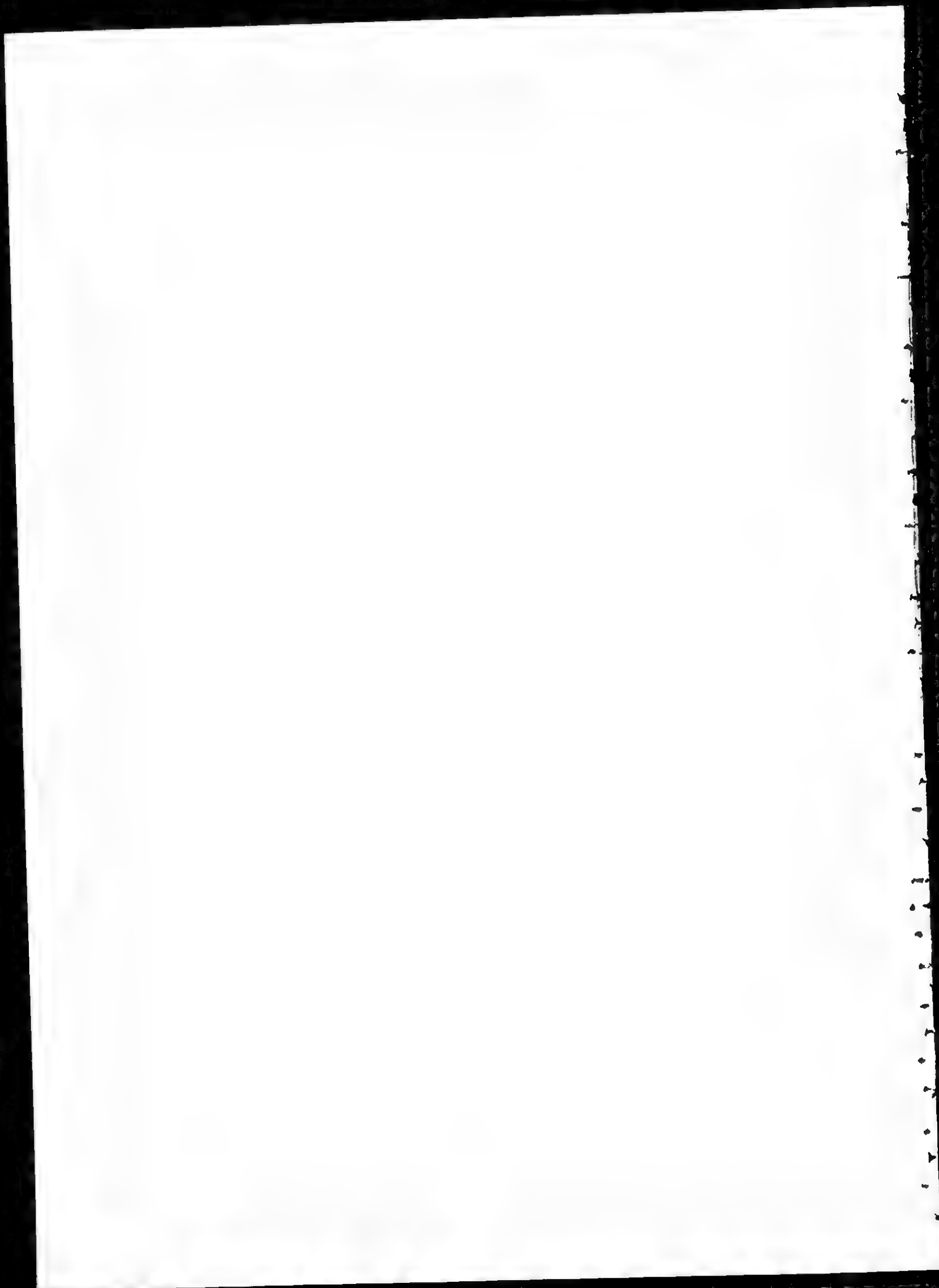
The limitation just quoted characterizes Murton's invention, distinguishes it from all three references and is responsible for Murton's new and useful result, transmitting the thrust of the sleeves through the insert to the rod flange and relieving the upper thin wall portion of the stop-

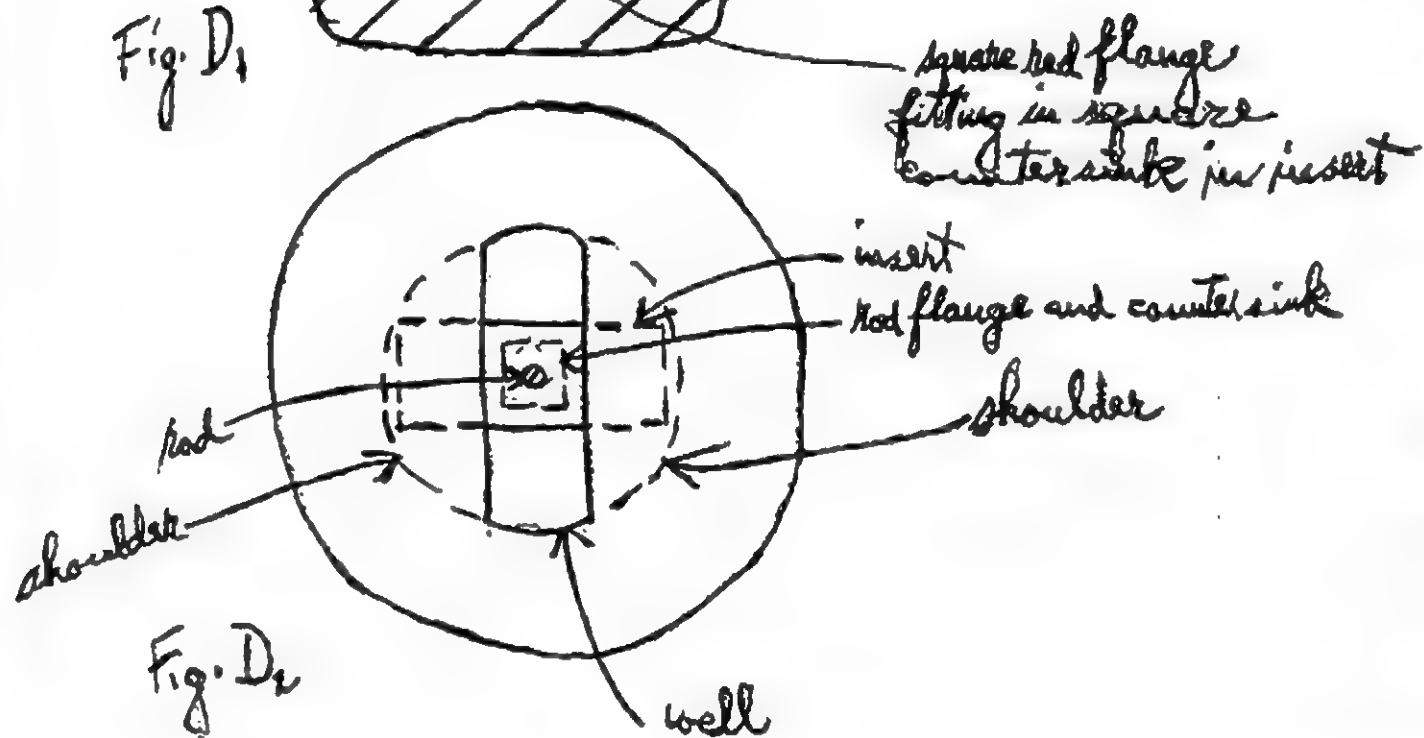
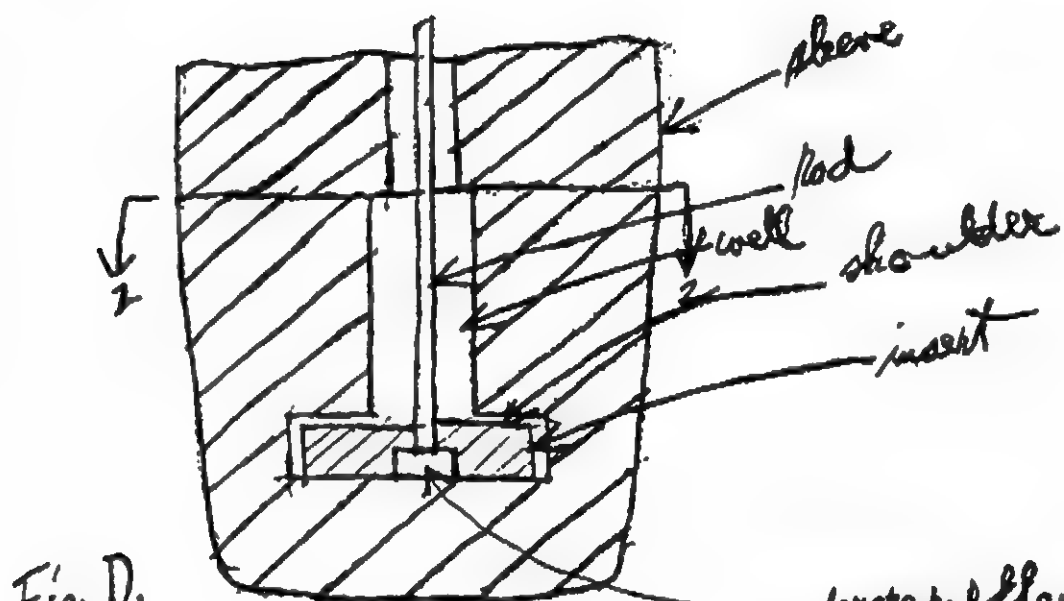
per head of stress imposed by the sleeves, thus minimizing stopper head failure.

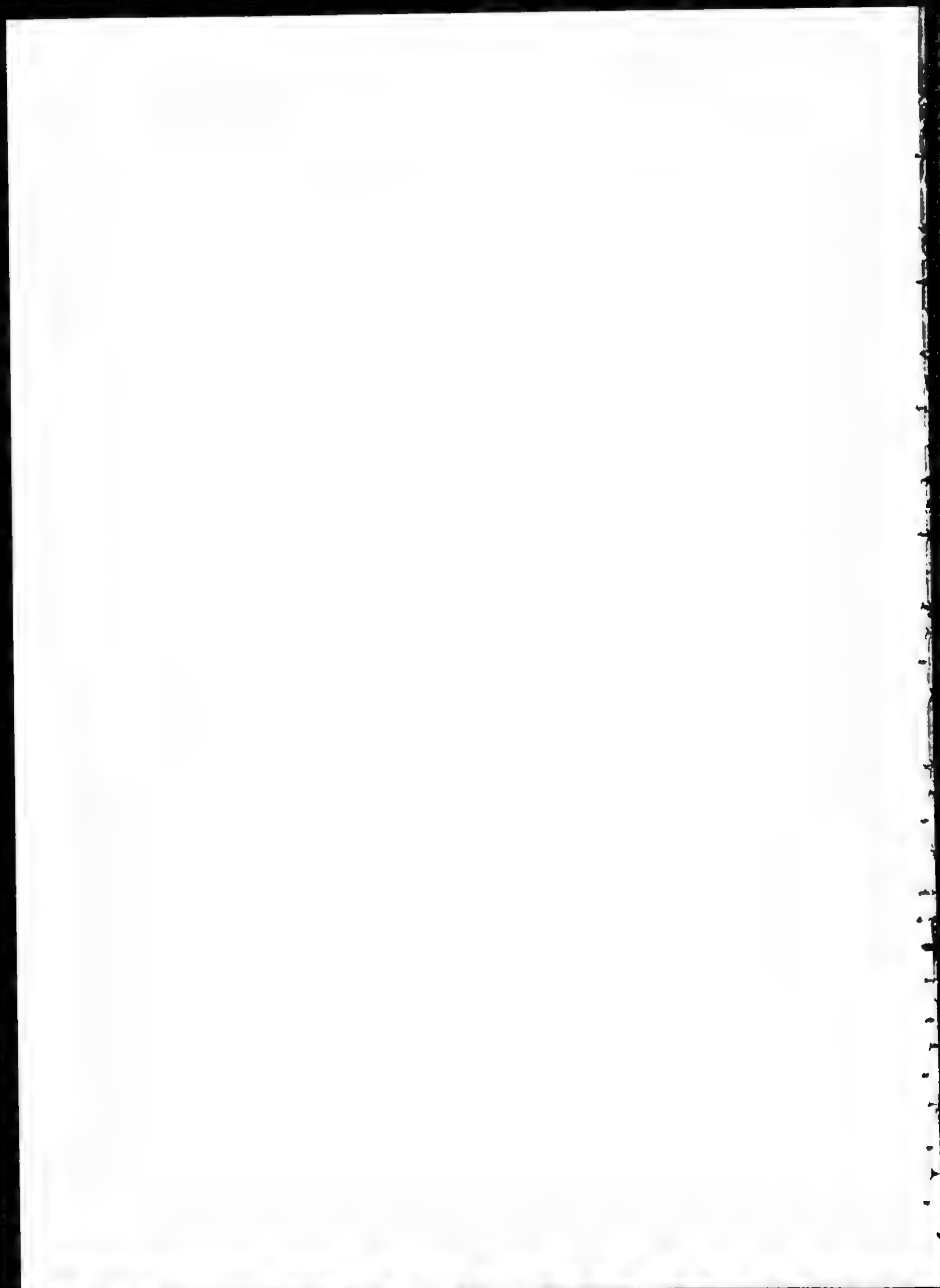
Claim 2, the only claim before this Court on this appeal, is directly readable on the structures of each of the following Figures A, C₁ and C₂, and D₁ and D₂.

Fig. A

Fig. C₁Fig. C₂







Claim 2 is directly readable on Figure A in which the nuts are separate *and sole means overlying* the lateral projection (flange), the nuts being connected to the head by the bolts. The structure of Figure A clearly *does not* transmit sleeve load through the inserts to the rod flange.

Claim 2 reads on the structure of Figures C₁ and C₂ in which the flat insert (separate means) is assembled on the rod and passed down through the vertical grooves in the head and then turned to locking position under the shoulder. The insert is the *sole means overlying* the lateral projection (flange). The structure of Figures C₁ and C₂ clearly *does not* transmit sleeve load through the inserts to the flange.

Claim 2 reads on the structure of Figures D₁ and D₂ in which the flat rectangular insert (separate means) having a square countersink is assembled on the rod, passed down the well, and then turned to locking position. The insert is the *sole means overlying* the square rod flange or projection. The structure of Figures D₁ and D₂ clearly does not transmit sleeve load through the inserts to the rod flange.

The above analysis of Figures A, C₁ and C₂, and D₁ and D₂ clearly shows that claim 2 including the limitation "sole means overlying" is directly readable on the structures of those figures in which the sleeve load is clearly not transmitted through the inserts to the rod flange. It is particularly emphasized that claim 2 defines no more than the simplest of these structures, namely that of Figure A. Accordingly, it is clear that the term "sole means overlying" is *not*

(as appellants contend in their brief, page 10, last 11 lines) "responsible for Murton's new and useful result" and *does not define* the necessary structure for obtaining appellants' undisclosed * advantage in appellants' undisclosed special use and *does not exclude* structure in which the undisclosed advantage is not obtained.

Accordingly, the District Court was clearly correct ** in the following finding of fact (J.A. 174):

This advantageous construction, however, does not appear to be directly set forth in the specification, and is certainly not recited by the claims.

Since appellants adduced expert evidence (J.A. 21, appellants' brief, page 8) that the said undisclosed advantageous construction is "critical" and since this construction is not claimed in claim 2, it follows that appellants in claim 2 have not complied with the requirement of 35 U.S.C. 112, paragraph 2, that an application must present "claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention". Accordingly, on that ground alone claim 2 is clearly unpatentable and on this appeal this Court need go no further to determine that the judgment of the District Court should be affirmed. *O'Brien v. Watson*, 104 U.S. App. D.C. 407, 262 F.2d 718; *Dyer v. Coe*,† 75 U.S. App.

* I.e., undisclosed in their application.

** Compare appellants' brief, page 24.

† In this case this Court on its own motion ordered a rehearing on the question of whether the requirements of R.S. § 4888 (the predecessor of 35 U.S.C. 112) had been met; and

D.C. 125, 130, 125 F.2d 192; *Seyfarth v. Coe*, 76 U. S. App. D. C. 96, 129 F.2d 58; *Broderson v. Marzall*, 90 U.S. App. D. C. 78, 194 F.2d 138 (see the disposition of claims 7, 8, and 9); *In re Caunt*, 23 CCPA 855, 81 F.2d 405; *In re Nilges*, 47 CCPA 978, 278 F.2d 514.

In view of the comments of the District Court at J.A. 173, it is noted that unduly broad and vague claims lacking clear definition of structure by their very nature invite divergence of approach in the consideration of the issues of patentability. It was not the Patent Office which drafted appellants' unduly broad claim 2. It was not the Patent Office which omitted to disclose in appellants' application the specific use of their structure and the advantage resulting therefrom. It was appellants who withheld from the Examiner and the Board of Appeals the full facts of their invention in commercial success, which facts as proved in the District Court clearly indicate that their claim 2 does not define what they contend is a critical part of their invention.

It is well settled that counsel for the Commissioner, as well as the courts on their own motion, may raise new issues of unpatentability in the action de novo under 35 U.S.C. 145. *Ballew et al. v. Watson*, 110 U.S. App. D.C. 162, 290 F.2d 353; *Dyer v. Coe*, *supra*; *American Steel and Wire Co. v. Coe*, 70 App. D.C. 138, 105 F.2d 17; *Preformed Line Products Co. v. Watson*, 103 U.S. App. D.C. 286, 257 F.2d 664,

held they had not been met. The Patent Office did not raise the issue, nor did the District Court.

cert. den. 358 U. S. 945; final disposition at 108 U.S. App. D.C. 95, 280 F.2d 643, cert. den. 364 U.S. 913. Where, as here, the claim in issue is clearly unpatentable on the new issue raised on the basis of appellants' new evidence before the District Court, it is immaterial whether there is or is not a presumption of correctness. *Ballew et al. v. Watson, supra*. See also *Dyer v. Coe, supra*.

Unpatentability of claim 2 over prior art

The Examiner rejected claim 2 as unpatentable over each of three patents taken individually. The District Court stated (J.A. 170):

The Examiner does not state whether his rejection is based upon 35 U.S.C. 102, or upon 35 U.S.C. 103.

35 U.S.C. 102(a) precludes patenting of claims devoid of novelty with respect to prior art, i.e. claims fully anticipated by the prior art. 35 U.S.C. 103 precludes patenting of claims which set forth novelty with respect to the prior art, the novelty being obvious to one ordinarily skilled in the art.

With respect to the British patent to Williams et al. (J.A. 157) the District Court stated (J.A. 175):

It does seem, however, that this reference *might* be avoided with respect to claim 2 by that claim's requirement that the insert be the "sole means overlying the lateral projection at the bottom of the rod." (emphasis added).

It is not clear what the court intended by that statement. Avoidance of a reference can mean no more

than that the claim is not fully anticipated by the reference patent. The District Court made no finding that the substance of claim 2 would be unobvious to one skilled in the art and therefore patentable under 35 U.S.C. 103.

Accordingly, the Williams patent is still before this Court on the issue of patentability of claim 2 under 35 U.S.C. 103.

As was demonstrated above, claim 2 is readable on and defines no more than the structure of Figure A at page 13 of this brief. Both the patent to Williams et al. (J.A. 157) and the patent to Sears disclose a rod having a flange at its lower end. It would clearly be obvious to one skilled in the art that the rod flange could be fastened to a hollow head by nuts and bolts in the manner shown in Figure A to produce the substance of claim 2, the nuts being the *sole means* overlying the lateral projection or flange and being connected with the head by the bolts to block withdrawal of the rod from the well. (See page 6 of appellee's brief before the District Court.)

The Board of Appeals in its findings as to claim 2 (J.A. 141, 142) clearly took into account the limitation which appellants stress in claim 2. Figures D₁ and D₂ (at page 14 of this brief) illustrate the structure which the Board of Appeals found obvious to one skilled in the art in view of the Sears patent and which structure corresponds to the limitations "sole means overlying" in claim 2.

The Board of Appeals stated (J.A. 141):

Even giving weight to the implied mode of assembly in a claim drawn to structure, we do not believe that these limitations patentably distinguish over Sears. This patent states that the tie rod 33 "carries at its lower end an anchoring member 34." Under this broad description, many ways of "carrying" the member 34 would at once become obvious to one skilled in the art among which would be to *provide a head on rod 33, preferably a non-circular head interengaging with a mating countersink in the member 34.* (emphasis added)

Appellee's Figures D₁ and D₂ of this brief (page 14) show a rod having at its end an element designated "insert" which corresponds to the head 34 of Sears. That insert is carried on "a head on rod 33, preferably a non-circular head," that non-circular head being shown in Figures D₁ and D₂ as having the most common of non-circular shapes, namely square. That square head is shown as interengaging with a countersink in the "insert" corresponding to Sears' element 34.

The Board also refers to the implied mode of assembly recited in claim 2, namely in the limitation "a rod having a lateral projection at its bottom inserted downwardly into the well." The Board is thus clearly speaking in terms of a non-circular head on rod 33 which is insertable into the well and therefore of less dimension than the well.

The Board thus clearly spoke in terms of the structure of said Figures D₁ and D₂ and held such structure to be obvious to one skilled in the art in the light of the Sears patent.

Appellants argued in the District Court that the Board did not suggest making the member 34 small and square. However, appellee *has not* in Figures D₁ and D₂ shown the member 34 small and square. Appellee in those figures has shown the large "insert" corresponding to the member 34 in the manner suggested by the Board.

Thus the Board has specifically found the structure of Figures D₁ and D₂ to be obvious to one skilled in the art in the light of the Sears patent and that finding is entitled to the presumption of correctness indicated in *Abbott et al. v. Coe*, 71 App. D.C. 195, 109 F.2d 449. As to that finding, appellants adduced no unambiguous and convincing testimony of an expert that the modification of Sears discussed by the Board and illustrated in the aforesaid Figures D₁ and D₂ would have been unobvious to one ordinarily skilled in the art (note particularly J.A. 36). Accordingly that finding of the Board stands consistent with all the evidence and, under *Abbott v. Coe*, 71 App. D.C. 195, 109 F.2d 449, should not be set aside by this Court.

**Additional grounds of unpatentability of claim 2
under 35 U.S.C. 112**

Appellant corporation's president in an affidavit submitted to the Patent Office in the instant application criticized (J.A. 97) the structure of the British patent to Williams et al. (J.A. 157) on the ground that it "necessarily has an eccentric well resulting in uneven shrinkage of the refractory mass in the drying and burning operation which in turn makes the stopper head peculiarly susceptible to the formation

of interval cracks". It is thus emphasized that the concentricity of the well of the stopper head is essential to the proper functioning of appellants' stopper head and to the extent that it is omitted in refused claim 2, the claim fails to point out and distinctly claim appellants' invention and is therefore unpatentable. 35 U.S.C. 112.

Appellants' application discloses a stopper rod having a concentric circular flange at its lower end and a well having shoulders along its inner wall. Appellant corporation's president in an affidavit submitted to the Patent Office in the instant application criticized (J.A. 99) the structure of the British patent to Williams et al. (J.A. 157) because of bearing force, between the rod flange and the stopper head, undesirably concentrated *at one side* of the head when the stopper is pulled upwardly from the ladle tapping hole in which it may be tightly held by solidified metal. Appellant corporation's president contrasted appellants' disclosed structure "in which the force exerted by the rod is distributed rather than concentrated at one side" (J.A. 100). Thus appellants' concentric circular flange and a shoulder or shoulders so located as to produce distribution of force concentric with the rod axis are essential. Moreover, appellant corporation's president in the same affidavit criticized (J.A. 101) the structure of the Bacon patent because of the limited cross-sectional area of the lateral projection or pin on his rod, with resulting stress concentration in stopper raising or lowering leading to alleged vertical ruptures of the Bacon

stopper head generally along a plane containing the axis of the pin. Appellant corporation's president contrasted appellants' disclosed structure which with its *concentric circular flange* and appropriately located shoulders produces even stress distribution and avoids off-center stress concentration. Thus for this further reason the *'concentric circular flange* and a specifically located shoulder or shoulders are essential. They are not set forth in the refused claim 2. That claim recites only a "lateral projection". (See the decision of the Board of Appeals, J.A. 141, third paragraph). Accordingly, for this additional reason the refused claim 2 fails to point out and distinctly claim appellants' invention and is therefore unpatentable. 35 U.S.C. 112.

Appellants' specification discloses (J.A. 72) that the inserts of their stopper head are preformed from the same refractory material as the head so as to have the same coefficient of thermal expansion as the head. The implication is that an insert material having a coefficient of expansion different from that of the head might *per se* be the cause of cracking the stopper head when it is subjected to extreme heat in its ordinary use. (See P. Ex. 14, page 5, midpage; and J.A. 18.) Appellants have made no showing that the insert material as disclosed in their specification is not essential to the utility of their device. The essential insert material is not set forth in the refused claim 2. Accordingly, for this additional reason that claim does not point out and distinctly claim appellants' invention and is therefore unpatentable. 35 U.S.C. 112.

**Appellants' evidence of an advantage
not disclosed in the specification**

Appellants in the joint appendix (J.A. 184 et seq.) have printed their petition for reconsideration before the District Court with their arguments as to their undisclosed advantage.

Those arguments confuse 1) the structure of their device as specifically disclosed in their application, 2) a specific use of their device (as proved at the trial) to produce a specific function of their disclosed device (which use and function in the application are not expressly disclosed), and 3) the scientific principle or theory of operation of and structure of the apparatus in the specific use. All that the decisions cited by appellants establish is that the third of the above items need not be disclosed.

In *Diamond Rubber Company v. Consolidated Rubber Tire Company*, 220 U. S. 428, 436, the Supreme Court stated:

This satisfies the law, which only requires as a condition of its protection that the world be given something new *and that the world be taught how to use it*. It is no concern of the world whether the principle upon which the new construction acts be obvious or obscure, so that it inheres in the new construction. (emphasis added)

In *Eames v. Andrews*, 122 U. S. 40, 55, the Supreme Court agreed with the following statement:

He sets forth the process or *mode of operation* which ends in the result, and the *means for working out* the process or mode of operation. The

principle referred to is only the why and the wherefore. That is not required to be set forth. (emphasis added)

In re Chilowsky, 43 CCPA 775, 229 F.2d 457, and 50 CCPA 806, 306 F.2d 908, in which the Patent Office rejection of claims for insufficient supporting disclosure was ultimately affirmed, adds nothing significant to the above-quoted statements of the Supreme Court.

Evidence of an advantage not disclosed in the specification of a patent *application* is ineffective for purposes of proving patentable invention in the substance of the claims thereof. *Abbott v. Coe*, 71 App. D.C. 195, 109 F.2d 449; *In re Dalzell et al.*, 35 CCPA 1024, 166 F.2d 834; *In re Steward*, 42 CCPA 937, 222 F.2d 747; *In re Rossi*, 44 CCPA 750, 241 F.2d 726; *In re Crawford*, 45 CCPA 750, 250 F.2d 370; *In re Lundberg*, 45 CCPA 838, 253 F.2d 244. Clearly distinguishable is the weight given in infringement suits to advantages not disclosed in a *patent* specification. Where the Patent Office has issued a patent, it has found patentable invention and the patent has the benefit of the presumption of validity. In such case, evidence of an additional advantage, not disclosed in the patent, merely reinforces the original finding of patentable invention and the presumption of validity. See *Diamond Rubber Co. v. Consolidated Tire Co.*, 220 U. S. 428, 434; *Westmoreland Specialty Co. et al. v. Hogan*, 167 Fed. 327; *Roberts Numbering Machine Co. v. Wetter Numbering Machine Co.*, 54 F.2d 461.

Appellants' evidence of commercial success

Appellants proved commercial success of concentric-well ladle stoppers in which the load of the columns of sleeves above the head is transmitted through refractory fastener inserts to a concentric circular flange at the end of the stopper rod, and in which the inserts have portions turned into position to underlie shoulders in the wells appropriately located for stress distribution concentric with the rod axis. Since refused claim 2 is not limited to and does not define such ladle stoppers, the commercial success is not attributable to the substance of that claim and is here immaterial. *Marconi Wireless Telegraph Co. of America v. United States*, 320 U. S. 1, 36; *Foxboro Co. v. Taylor Instrument Co.* (CA 2), 157 F.2d 226, 233.

The real issue in this case

The Patent Office by allowance of claim 8 (J.A. 4) has recognized that appellants have disclosed patentable substance in the specification and drawings of their application. Specifically, by allowance of claim 8 the Patent Office has recognized patentable substance in the structure disclosed in Fig. 6 (J.A. 79). The Patent Office has not held that there is no patentable substance in the disclosure of the *specific structure* of Figures 1 through 5 (J.A. 77). It has held only that there is no patentable substance in claim 2 and other claims not here on appeal. As shown previously, claim 2 is unduly broad. Appellants withdrew (J.A. 96) proposed specific claim 14 (J.A. 90) and therefore the Examiner did not pass

on its patentability. The real issue in this case is not whether appellants have disclosed an invention patentable over the prior art but whether they have *defined* an invention patentable over the prior art in their claim 2.

Appellants have an adequate remedy by prompt prosecution of claims of proper scope in a continuation application, and by taking of appropriate steps to avoid a *res judicata* situation in such continuation application.

CONCLUSION

Claim 2 on appeal, it is submitted, was properly refused to appellants by the Patent Office and the District Court. It is submitted that the judgment appealed from was correct and should be affirmed.

Respectfully submitted,

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Solicitor, United States Patent Office
Attorney for Appellee.

GEORGE C. ROEMING,
Of counsel.

March, 1965.

UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 19,083

CRAWFORD B. MURTON AND VESUVIUS CRUCIBLE
COMPANY, APPELLANTS

v.

DAVID L. LADD, Commissioner of Patents, APPELLEE

CERTIFICATE

I hereby certify that the typewritten brief has been placed in the hands of the printer and that no changes in the brief to be filed in printed form will be made, except for minor changes or corrections.

/s/ C. W. MOORE
Solicitor, United States Patent Office
Attorney for Appellee

March 5, 1965.

UNITED STATES COURT OF APPEALS
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PROOF OF SERVICE

I hereby certify that 3 copies of the typewritten Brief for Appellee, David L. Ladd, Commissioner of Patents, and one copy of the attached Certificate were handed today, March 5, 1965, to Mr. Spencer B. Michael, 922 Woodward Building 15th, and H Streets, N. W., Washington, D. C. 20005, attorney for appellants.

/s/ C. W. MOORE
Solicitor, U. S. Patent Office

March 5, 1965.

REPLY BRIEF FOR APPELLANTS

IN THE
United States Court of Appeals
FOR THE DISTRICT OF COLUMBIA CIRCUIT

NO. 19083

**CRAWFORD B. MURTON and VESUVIUS
CRUCIBLE COMPANY, Appellants,**

v.

**DAVID L. LADD, Commissioner of Patents,
Appellee.**

**Appeal From a Judgment of the United States District
Court for the District of Columbia**

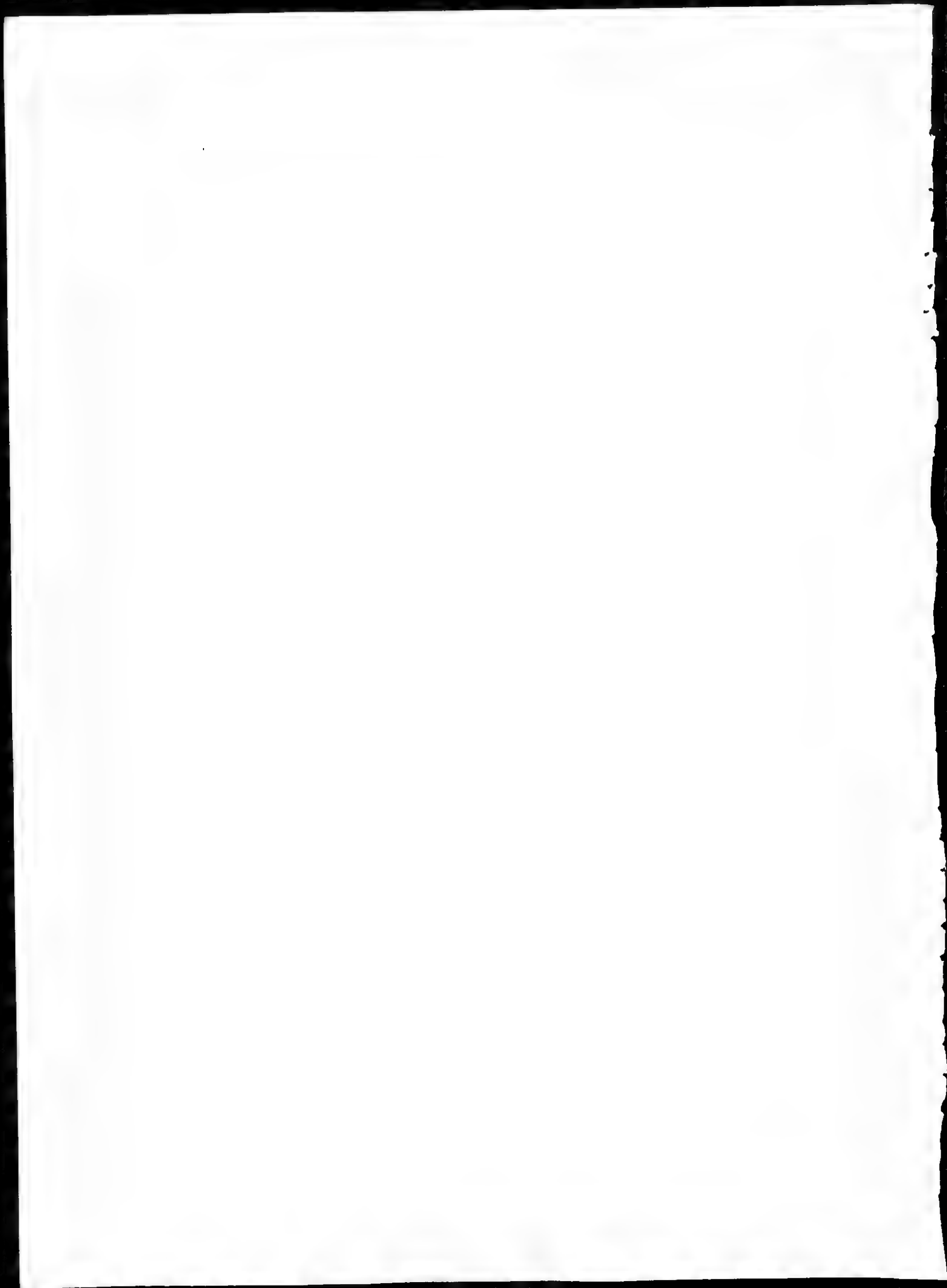
United States Court of Appeals
For the District of Columbia Circuit

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IN THE
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DAVID L. LADD, Commissioner of Patents,
Appellee

REPLY BRIEF FOR APPELLANTS

FOREWORD

**The Disparate Positions of the
Patent Office Tribunals and Appellee**

The trial judge (JA 173) adverted to the disparate positions taken by the Patent Office tribunals and the defendant before the District Court. The District Court did not adopt the defendant's (now appellee's) position but followed what the Court called the "analysis" of the examiner. This point is treated at pages 13-15 of appellants' main brief where it is demonstrated that the examiner's "analysis" which the Court adopted completely disregards the critical limitation of claim 2 that the insert is "the sole means overlying the lateral projection at the bottom of the rod" and strongly indicates that the examiner was not aware of that limitation.

Appellee now seeks affirmance of the trial court's judgment on the ground that claim 2 does not properly define Murton's invention and is broader than the invention, a position put forward in the District Court but which the Court declined to adopt. (JA 173-4)

It is difficult to follow appellee's line of reasoning; portions of appellee's brief rebut each other. At pages 10-11 appellee seems to be suggesting that Murton's disclosure is insufficient, yet at page 27 appellee flatly says:

"The real issue in this case is not whether appellants have disclosed an invention patentable over the prior art but whether they have *defined* an invention patentable over the prior art in their claim 2.

"Appellants have an adequate remedy by prompt prosecution of claims of proper scope in a continuation application, and by taking of appropriate steps to avoid a *res judicata* situation in such continuation application." (Emphasis appellee's).

This certainly eliminates any issue as to the sufficiency of Murton's disclosure, for were not his disclosure sufficient Murton could not procure "claims of proper scope in a continuation application" as appellee states. Appellee is bound by the admission that Murton's disclosure is sufficient (*O. F. Nelson & Co., Limited v. United States*, 149 F.2d 692; see syllabus 8) and we shall not devote any further argument to that point.

The Basic Error in Appellee's Position

The basic error in appellee's position is the premising of his entire argument upon alleged facts which are not facts but are shown by the evidence not to exist.

Not only does appellee persist in completely disregarding the very clear showing of the advantage of the

Sergy's Testimony Completely Uncontradicted. 3

invention contained in Fig. 6 of the Murton application, but he also disregards the undisputed testimony of appellants' witness Sergy, a highly qualified expert in the art. Sergy's qualifications appear at JA 10-11. His completely uncontradicted testimony as to what the Murton application teaches the person skilled in the art appears at JA 27 and is set forth verbatim at page 9 of appellants' main brief.

An example passage in appellee's brief evidencing the error in appellee's position is the following (pp.15-16):

"Accordingly, it is clear that the term 'sole means overlying' is *not* (as appellants contend in their brief, page 10, last 11 lines) 'responsible for Murton's new and useful result' and *does not define* the necessary structure for obtaining appellants' undisclosed advantage in appellants' undisclosed special use and *does not exclude* structure in which the undisclosed advantage is not obtained." (Emphasis appellee's).

The *fact* is, as Sergy testified, that the advantage is disclosed so as to be clearly understandable by a person skilled in the art. Sergy's testimony is there; it is clear and unequivocal and *completely uncontradicted*.

Appellee persists in arguing his case as though Sergy's testimony did not exist, seemingly on the theory that if Sergy's testimony is sufficiently ignored it will fade away. Sergy's testimony stands as a part of the record to be considered by this Court. This Court held in *Stone v. Stone*, 78 U.S. App. D.C. 5, 8; 136 F 2d 761, 764:

"In this case there was positive testimony, uncontradicted, and not inherently improbable. Neither a jury nor a judge is at liberty to disregard such evidence. '* * * where the testimony is all one way, and is not immaterial, irrelevant, improb-

4 *Appellee Adduced No Rebutting Testimony.*

able, inconsistent, contradicted, or discredited, such testimony cannot be disregarded or ignored by judge or jury, and if one or the other makes a finding which is contrary to such evidence, or which is not supported by it, an error results, for which the verdict or decision, if reviewable, must be set aside. To hold otherwise would vest triers of the facts in cases subject to review with authority to disregard the rules of evidence which safeguard the liberty and estate of the citizen. *Kelly v. Jackson*, 6 Pet. 622, 631, 8 L.Ed. 523.' "

In addition to ignoring Sergy's testimony appellee did not attempt to adduce any testimony rebutting Sergy. Appellee's failure to call witnesses raises the inference that any testimony which appellee might have adduced would have been adverse to him. This rule is well established; see, for example, *Gross v. Williams et al.*, 149 F. 2d 84, 86.

Also appellee refuses to recognize that the drawing of a patent application can furnish vital disclosure to persons skilled in the art. See *Howe v. Atwood et al.*, 47 F. S. 979, 987:

"However, what is more important is that the drawing accompanying the second Howe hinge [patent] shows how it could be utilized with two pintles as well as one, and incidentally one of the arguments used by defendants in limiting Howe's first patent was that his drawings did not cover a duplex (two pintle) hinge. But Howe's drawing in the second patent did — and the drawings accompanying a patent with its claims are illuminating when the question of prior art and intended coverage is at issue. *Wadsworth Electric Mfg. Co., Inc., v. Westinghouse Electric & Mfg. Co.*, 6 Cir., 71 F. 2d 850, 852; *Whitin Mach. Works v. Houghton*, 1 Cir., 178 F. 444."

**THE MURTON APPLICATION IS ADDRESSED
TO PERSONS SKILLED IN THE ART**

It is hornbook law that a patent specification (which includes description, claims and drawings; 35 U.S.C. 112, 113) is addressed to persons skilled in the art and is sufficiently clear and descriptive when understandable to a person skilled in the art to which it relates. See, for example, *Haseltine Research, Inc. v. Dage Electric Company, Inc.*, 271 F. 2d 218, 220-1:

"The Supreme Court has repeatedly held that a specification in letters patent is sufficiently clear and descriptive when expressed in terms intelligible to a person skilled in the art to which it relates. *Webster Loom Co. v. Higgins*, 1881, 105 U.S. 580, 26 L. Ed. 1177; *Seabury v. Am Ende.*, 1894, 152 U.S. 561, 567, 14 S. Ct. 683, 38 L. Ed. 553; *Carnegie Steel Co. v. Cambria Iron Co.*, 1902, 185 U.S. 403, 437, 22 S. Ct. 698, 46 L. Ed. 968.

"Therefore, determination of the question of vagueness and uncertainty must be made in light of what a person skilled in the electronics art would be able to glean from the Salati patent."

When the Murton application is considered from the standpoint of what it means to a person skilled in the art the teaching of the disclosure and the meaning of the claim are perfectly clear. This is established by Sergy's testimony. See pages 9 and 12 of appellants' main brief. This points up the main controversy in the case, i.e., the contention by appellants that the Murton disclosure and claim be viewed from the standpoint of the person skilled in the art versus appellee's insistence upon his own interpretation of Murton's disclosure disregarding the expert testimony. Appellants are right in law and must prevail.

6 *Appellee Misconstrues Murton's Drawing.*

The weakness of appellee's position as to Murton's disclosure is revealed by the argument at page 11 of appellee's brief that

"... in Figure 6, the insert is shown threaded into the head-well but out of contact with the rod flange so that on downward thrust of the stopper any sleeve load carried by the insert is transmitted through the wall-thread and through the wall to the bottom of the head." (Emphasis appellee's).

This statement is *directly contrary* to Sergy's testimony and not based on any evidence in the case. Moreover, it is a misconstruction of the drawing. This is simply the draftsman's way of making the diagrammatic showing called for by 35 U.S.C. 113 and Patent Office Rule 81. Note the spaces between the threads 10a of the insert 9a and the threads 6a of the well 4a in the head 2a. Also note the spaces between the insert and head and between the insert and the rod flange in Fig. 5. In Fig. 5 there is nothing to hold the insert up in the position in which it is shown and it is obvious that it must seat on the rod flange. Thus the spaces simply reflect the drafting technique employed in making the drawings and any person skilled in the art would so understand in considering Figs. 5 and 6. Appellee's criticism of Fig. 6 based on the spaces shown by the draftsman is lacking in substance.

However, appellee's admission at the end of his brief (see *supra*, p. 2) that Murton's disclosure is sufficient negates the earlier aspersions on the sufficiency of the disclosure. The real issue is indeed whether claim 2 sufficiently distinguishes over the prior art.

**APPELLANTS' ANSWER TO APPELLEE'S
STATEMENT OF QUESTIONS PRESENTED**

Appellee presented four questions for the Court's consideration. These appear at an unnumbered page of appellee's brief immediately preceding the index.

Appellants' answers to appellee's four questions are as follows:

1. No. Appellee's question No. 1 is based upon the false premise that Murton's critical structure "is not defined in claim 2". That structure is defined in claim 2.
2. This question also is founded upon an erroneous premise—that the Board of Appeals "found the substance of claim 2 obvious to one skilled in the art in view of the Sears patent". The Board of Appeals did not consider the critical limitation of claim 2 and did not relate that limitation to the Sears patent.
3. No. None of the references teaches a structure in which the insert is the sole means overlying the rod flange whereby the bottom sleeve has unrestricted access to the insert enabling the thrust of the sleeves to be transmitted through the insert to the rod flange.
4. No. The "features" referred to in question No. 4 were *not* represented as being *essential* to the Murton invention.

**APPELLANTS' REPLY TO APPELLEE'S
SUMMARY OF ARGUMENT**

What appellee calls the "special use" of Murton's disclosed structure is made perfectly clear to those skilled in the art by Fig. 6 of Murton's drawings (JA 27, 79), and the structure necessary for accomplishment of such special use or advantage is clearly and accurately defined by claim 2 (JA 27-8). See pages 9 and 12 of appellants' main brief.

Fig. 6 of Murton's drawings (JA 79) discloses the bottom sleeve 18 bearing on the insert 9a which in turn bears on the rod flange 17a (see *supra*, p. 6). This has the advantage of relieving the upper thin-walled portion of the stopper head 2a of the downward thrust of the sleeves. The structure which makes possible the realization of that advantage is the provision of the insert as the sole means overlying the rod flange, for that is what provides for the bottom sleeve to have unrestricted access to the insert to bear upon the insert. If some portion of the head were disposed to overlie the rod flange there could not be successive downward bearing of the sleeve upon the insert and the insert upon the rod flange. It is this successive downward bearing of the elements mentioned, each upon the one below it, which is responsible for relieving the thin-walled upper portion of the head of the pressure of the sleeves. Claim 2 very clearly defines exactly the structure required to accomplish Murton's new and useful results.

The substance of claim 2 is not obvious to one skilled in the art in view of the references as each reference discloses exactly the opposite of the Murton invention,

i.e., each reference discloses *the sleeves bearing directly upon the top of the stopper head* (JA 28-9). The fact is that neither the examiner nor the Board of Appeals considered the limitation of claims 2 that *the insert is the sole means overlying the rod flange* since that limitation was lost sight of in consideration of other features in other claims.

The Significance of the Limitation of Claim 2.

The limitation of claim 2 that the insert is "the sole means overlying the lateral projection at the bottom of the rod" is the critical limitation responsible for the utility of Murton's ladle stopper. Sergy testified (JA 19):

"Every time the stopper is jammed down into the nozzle the inertia of the sleeves causes a mass or weight to come to bear on the sleeves which then bears on the head which then subjects the head to acute possibility of failure. The head stops at the nozzle on the downward thrust. The sleeves continue to apply a thrust down onto the head. This is at a time when the head is most vulnerable to receive that thrust."

Head failure results in danger to workmen, destruction of equipment and heavy financial loss—\$5,000 to \$10,000 for each head failure (JA 20).

Sergy testified (JA 21):

"Murton differs from the references cited, and he differs in an important and very critical manner. Murton's stopper head has a separate insert. This insert is applied or inserted into the stopper head overlying the rod flange and is connected to the head. When the rod is raised the head is raised. The weight of the sleeves cannot be carried by the head. The weight of the sleeves is carried by the insert, and the thrust of the sleeves is transmitted through

10 *Nothing But Insert Is Above Rod Flange.*

the insert to the rod flange. It frees the head of any such stress and there is less danger of head failure.

* * * * * *

"The experience with the Murton stoppers has resulted in a decrease in the head failures. The experience with respect to failures with the other stoppers amounted to about 10 percent. Failures with the Murton stopper head have been less than 3 percent."

The characteristic of Murton's ladle stopper that the insert is the "sole means overlying the lateral projection at the bottom of the rod" *is responsible for Murton's improved results. It enables the insert to seat on the rod flange and the sleeves to seat on the insert.* Sergy stated (JA 163):

"The thrust of the sleeves is exerted on the insert and is transmitted through the insert to the rod flange. The head is free of thrust imposed by the sleeves. This is of paramount importance when the stopper is jammed down in the ladle nozzle to stop the flow of molten steel out of the ladle under the extremely severe thermal conditions existing."

Sergy further stated (JA 32):

"Murton's insert has no equivalent in the references cited, and it makes possible the relieving of the stress imposed by the sleeves. It makes possible the use of an insert which transmits this thrust downwardly to a flange on the rod, thereby freeing the head of any thrust and thereby greatly improving the chances of not having head failure."

Of course the reason why Murton's insert has the new function described by Sergy is because *nothing but the insert is disposed above the rod flange, which allows the sleeves to seat on the insert while the insert seats on the rod flange.*

**APPELLEE'S POSITION IS BASED ON APPELLEE'S
SKETCHES AT PAGES 13 and 14 OF APPELLEE'S
BRIEF WHICH DO NOT SUPPORT APPELLEE'S
ARGUMENT**

Appellee's position in this Court is founded largely upon the sketches appearing at pages 13 and 14 of appellee's brief. Appellee states that claim 2 in issue reads on the structures shown in those sketches. Appellee disregards the fact that the invention in issue is in a ladle stopper constructed to cooperate with overlying sleeves in a unique manner disclosed in the application, the sleeves not being part of the ladle stopper. The situation is made clear in the *undisputed* testimony of Sergy which is quoted verbatim at page 12 of appellants' main brief. Murton explained that a person skilled in the art would understand that the ability of the insert to support the sleeves, thereby transmitting the thrust of the sleeves through the insert to the rod flange, is an *advantage* of the Murton invention which is *derivable from the defined structure*.

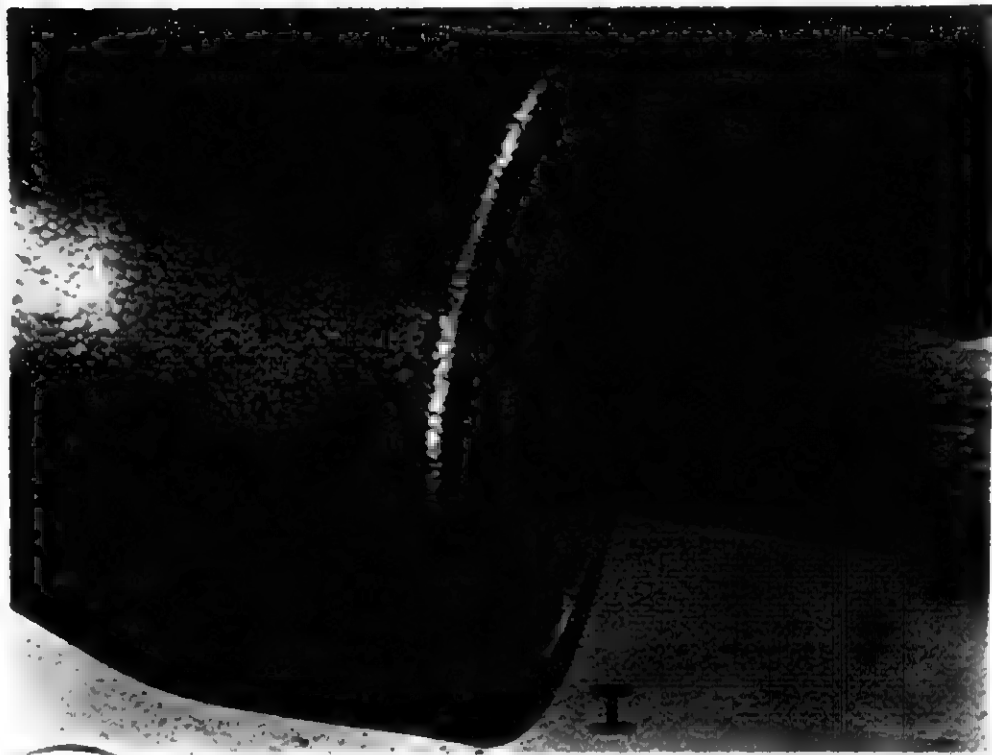
If the sleeves which appellee has shown in his sketches were omitted, the structures remaining would respond to claim 2. Appellee does exactly the opposite of what Murton teaches in showing sleeves seated directly on the stopper head. Fig. 6 of Murton's drawings very clearly shows the sleeve 18 seated on the insert 9a which in turn seats on the rod flange 17a. The portions of appellee's sketches which consist of sleeves seated directly on the stopper head are self-serving and not based upon Murton's teaching and deprive appellee's sketches of any probative or argumentative value to appellee. Rather the sketches are of value to appellants

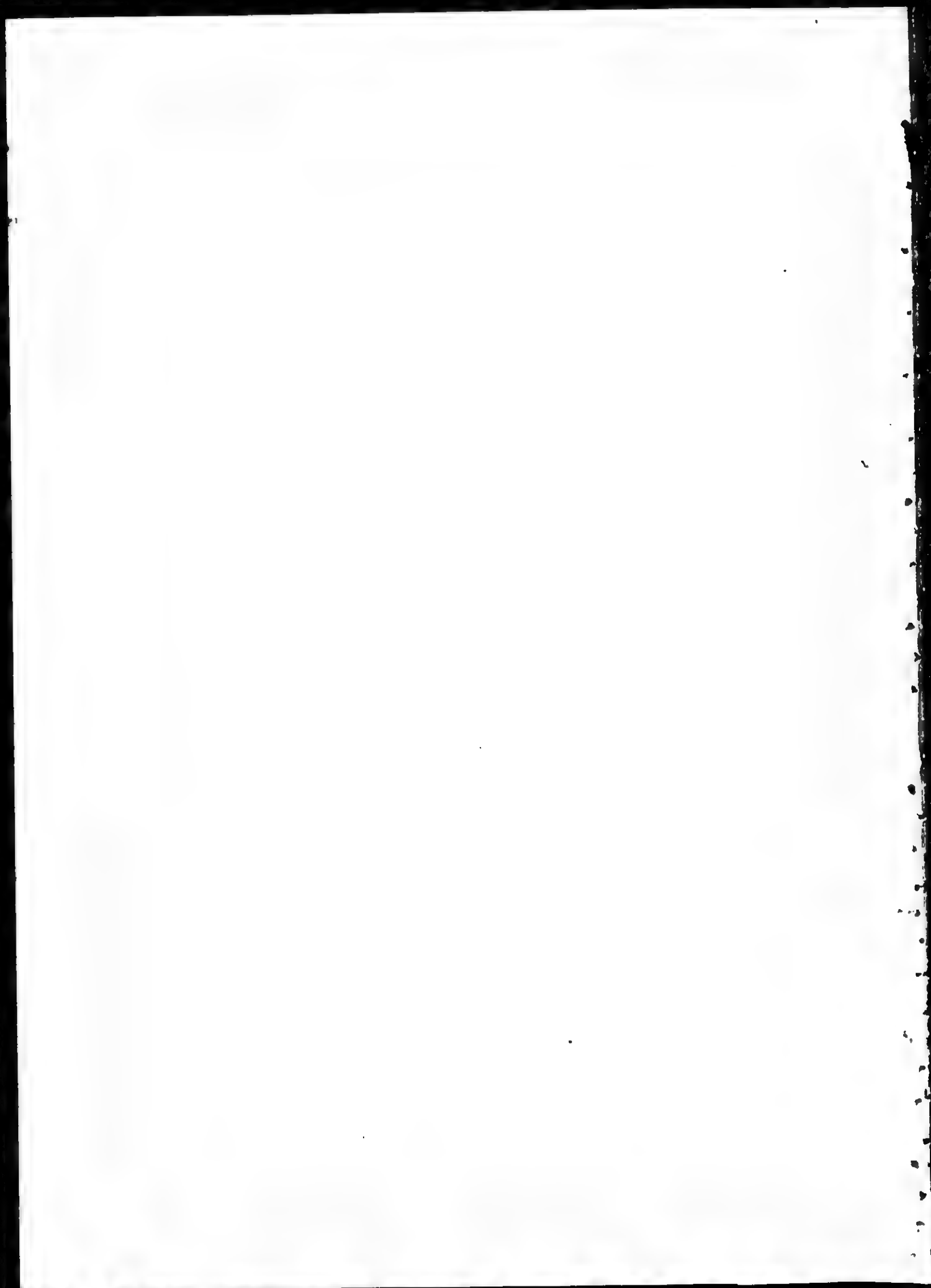
for they reveal and emphasize the lack of substance of appellee's position.

A person skilled in the art would, consistently with the undisputed evidence, utilize a sleeve with a downward projection with the structures shown in appellee's sketches to accomplish the result disclosed in Fig. 6 of Murton's drawings, i.e., the transmission of the thrust of the sleeves through the insert to the rod flange. See Sergy's testimony quoted verbatim at page 9 of appellants' main brief.

The exhibits in evidence exemplify both a structure of the type shown in Fig. 6 of Murton's drawings and a structure of the type shown in Figs. 1-5 of Murton's drawings each employed with a sleeve selected by a person skilled in the art as taught by Fig. 6 and explained by Sergy (JA 27). Exhibit No. 18 is a stopper head as shown in Fig. 6 and exhibit No. 19 is a sleeve for use with that form of stopper head. Those exhibits conform to Murton's Fig. 6 (JA 79). Exhibit No. 15 is a stopper head as shown in Figs. 1-5 and exhibit No. 17 is a sleeve with a downward annular flange to rest on the insert 9 of Fig. 5 which terminates flush with the top of the stopper head. The selection of such a sleeve for use with the form of Figs. 1-5 consistently with the teaching of Fig. 6 is in exact accord with the evidence (JA 27) which is completely undisputed yet which appellee disregards.

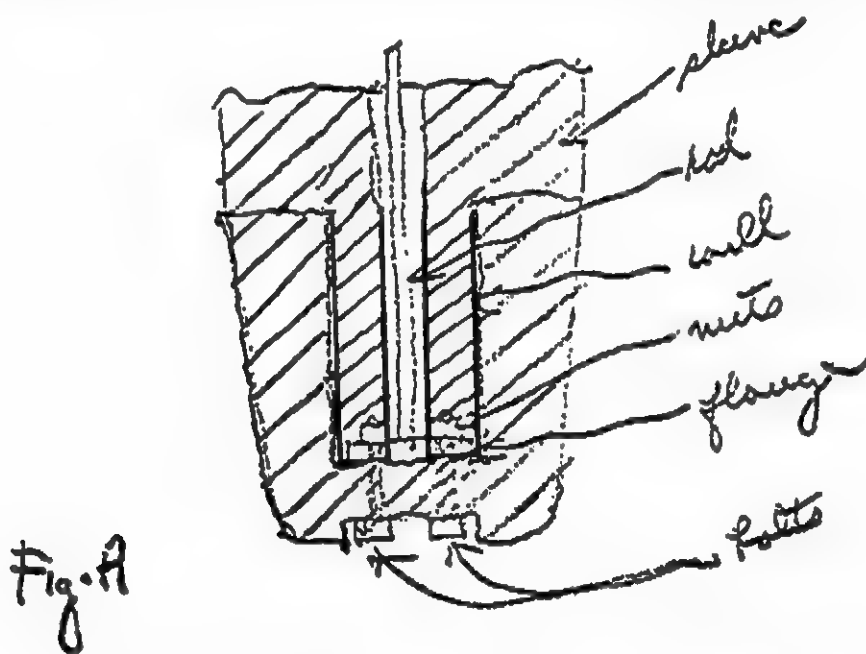
The motion picture, exhibit No. 13, shows both forms, first the form of Fig. 6 and then the form of Figs. 1-5. We reproduce on the opposite page two frames of the motion picture which are marked respectively I and II. Frame I shows the stopper head as disclosed





in Murton's Fig. 5. Frame II shows the sleeve exhibit No. 17 with the projection to engage the top of the insert. Thus the thrust of the sleeves is upon the insert and is by the insert transferred to the rod flange.

A sleeve with a downward projection would be selected by the person skilled in the art for use with the structures shown in appellee's sketches since such a sleeve, consistently with the teaching of Fig. 6, would transfer the thrust of the sleeves to the rod flange. We here reproduce appellee's Fig. A but with a sleeve with a downward projection as taught by Murton used in place of the sleeve seated atop the stopper head as drawn by appellee in each of the sketches in appellee's brief in complete disregard of Murton's teaching. All of appel-



lee's other sketches could be similarly modified. While the ladle stoppers shown in appellee's sketches would, for practical purposes, not be preferred by those skilled in the art, they do, when equipped with sleeves with

downward projections in accordance with Murton's teaching, show forms which Murton's invention might take.

The sound track of the motion picture contains the following (JA 163) :

"The insert [referring to the form shown in the picture marked I] differs from the screw threaded form in that the lug type insert when installed is flush with the top of the head and does not project above the head as the screw type does. The bottom sleeve used with the lug type has a downward annular projection shown here which bears on the insert, freeing the head from the thrust of the sleeves. The sleeve is shifted up to the head so that the projection on the sleeve bears on the insert. See the gap between the head and the sleeve. This is precisely the same function as is performed by the screw type insert."

MURTON'S CLAIM MEETS THE STATUTORY REQUIREMENTS

Claim 2 in issue meets the statutory requirements and the test prescribed by the decisions cited at page 18 of appellee's brief. Appellee's error is in the apparent belief that because the *advantage* of the invention is not spelled out in the specification the claim is unpatentable. The answer to this is twofold: (1) the advantage of the invention is clearly disclosed to those skilled in the art as explained by Sergy (see pages 9 and 12 of appellants' main brief) and (2) it is not necessary that the inventor recite or even fully understand the advantage of the invention at the time the application is filed. All that is necessary is that the claim properly define the *structure* whereby the advantage is accomplished.

In *Diamond Rubber Company v. Consolidated Rubber Tire Company*, 220 U.S. 428, the court held (syllabus 2) that "An inventor is entitled to all that his patent fairly covers, even though its complete capacity is not recited in the specifications and was unknown to the inventor prior to the patent issuing". At pages 435-436 the court said:

"And how can it take from his merit that he may not know all of the forces which he has brought into operation? It is certainly not necessary that he understand or be able to state the scientific principles underlying his invention, and it is immaterial whether he can stand a successful examination as to the speculative ideas involved. *Andrew v. Cross*, 8 Fed. Rep. 269; *Eames v. Andrews*, 122 U. S. 40, 55; *St. Louis Stamping Co. v. Quinby*, 16 Off. Gaz. 135; *Dixon Wood Co. v. Pfeifer*, 55 Fed. Rep. 390; *Cleveland Foundry Co. v. Detroit Vapor Stove Co.* (C.C.A. Sixth Circuit), 131 Fed. Rep. 853; *Van Epps*

v. United Box Co. (C.C.A. Second Circuit), 143 Fed. Rep. 869; *Westmoreland Specialty Co. v. Hogan* (C.C.A. Third Circuit), 167 Fed. Rep. 327."

See also *Cold Metal Process Co. v. United Engineering & Foundry Co.*, 3 F.S. 120, 129, and cases cited.

APPELLEE INCORRECTLY REPRESENTS HOLDING OF BOARD OF APPEALS

Appellee represents the sketches designated Fig. D₁ and Fig. D₂ at page 14 of his brief as illustrating "the structure which the Board of Appeals found obvious to one skilled in the art in view of the Sears patent and which structure corresponds to the limitations 'sole means overlying' in claim 2" (page 19 of appellee's brief). This is not correct as the Board was not cognizant of the "sole means overlying" limitation and was attempting to modify Sears by construction of the phrase "carries at its lower end an anchoring member 34" in the Sears patent to produce a structure responding to another clause of the claim, to wit, "means separate from the head also inserted downwardly into the well above the lateral projection at the bottom of the rod into position to overlie at least a portion of the lateral projection at the bottom of the rod and thereby block withdrawal of the rod from the well and connected with the head whereby to attach the rod to the head". Exhibit No. 22 is a wooden model of the stopper rod suggested by the Board of Appeals.

While the Board's proposed reconstruction of Sears derives from Murton's teaching and not from any teaching found in the Sears patent (JA 35-6), appellee has gone a step beyond the Board in shrinking the size of

the flange at the bottom of Sears's rod 33 so that it does not extend out beneath any portion of the stopper head as it actually does in Sears as shown at Y at JA 180. This is a further reconstruction of the reference which even the Board did not contemplate and which derives solely from Murton's teaching.

Thus appellee's attempt to show that the Board with the "sole means overlying" limitation in mind reconstructed the Sears structure to respond to Murton's claim 2 not only falls of its own weight but includes a further reconstruction step by appellee which the Board never contemplated at all.

Since it is clear that the Board was unaware of the "sole means overlying" limitation in claim 2 when it rejected that claim on Sears, this Court's holding in *Abbott et al. v. Coe*, 71 U.S. App. D. C. 195, 109 F.2d 449, cited by appellee at page 21 of his brief, is not apposite.

**THE CRITICISMS OF THE REFERENCES BY
APPELLANT CORPORATION'S PRESIDENT
DO NOT CONSTITUTE LIMITATIONS
UPON MURTON'S INVENTION**

Harley, appellant corporation's president, filed an affidavit criticizing the structures of the references in various respects. As is apparent from consideration of the Harley affidavit (JA 97), Harley was concerned with practical aspects of the structures of the references and nowhere stated that the limitations he mentioned are essentials of the Murton invention. It is noted that appellee cites no decision supporting this argument. The reliance upon such a position is submitted to reveal the inherent weakness of appellee's case.

APPELLEE'S AUTHORITIES NOT APPOSITE

Appellee's argument at pages 24 and 25 of his brief and the authorities there cited are not apposite. Appellee has made up a new rule of law, to wit, that there is a distinction between a patent *application* and an issued *patent* in respect of the necessity of describing in the specification the advantages of the invention. Appellee states that in the case of patents "evidence of an additional advantage, not disclosed in the patent, merely reinforces the original finding of patentable invention and the presumption of validity (page 25 of appellee's brief). However, a reading of the cases cited by appellee shows that the advantages which were the subjects of contention were held to support patentability. Without those advantages patentability would have been absent. *The reasoning is no different when an application is involved than when a patent is involved.*

But even if there were a rule of law such as appellee contends it would not apply in the present case because, as brought out by completely uncontradicted testimony of Sergy, the Murton application, particularly through Fig. 6 of the drawings, adequately discloses the advantage of the invention.

APPELLANTS' EVIDENCE OF COMMERCIAL SUCCESS

Appellee states at page 26 of his brief that appellants proved commercial success of a particular detailed ladle stopper structure. Appellee argues that since claim 2 is not limited to all the details of the structure, commercial success is not attributable to that claim. The commercial success is attributable to the Murton ladle stopper which is properly defined by claim 2. It is not essential that the ladle stopper have all the limitations catalogued by appellee at page 26 of his brief, such, for example, as a concentric circular flange. The claim specifies "a lateral projection" at the bottom of the rod. While in the commercial form the "lateral projection" is a circular flange it could be otherwise shaped while still accomplishing the same result. This specious position further reveals the lack of substance in appellee's case.

THE REAL ISSUE IN THIS CASE

This section of appellee's brief appearing at pages 26-7 is treated above at pages 9-10 and 15-16.

CONCLUSION

Appellee admits the sufficiency of Murton's disclosure and the evidence establishes that claim 2 in issue properly defines Murton's invention. That claim should be allowed along with previously allowed claim 8. The judgment of the District Court should be reversed.

Respectfully submitted,

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March 19, 1965.

FILED OCT 13 1965

Nathan J. Paulson
CLERK

PETITION FOR REHEARING

IN THE
United States Court of Appeals
FOR THE DISTRICT OF COLUMBIA CIRCUIT

NO. 19083

CRAWFORD B. MURTON and VESUVIUS
CRUCIBLE COMPANY, Appellants,

v.

DAVID L. LADD, Commissioner of Patents,
Appellee.

Appeal From a Judgment of the United States District
Court for the District of Columbia

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IN THE
United States Court of Appeals
FOR THE DISTRICT OF COLUMBIA CIRCUIT

NO. 19083

**CRAWFORD B. MURTON and VESUVIUS
CRUCIBLE COMPANY, Appellants,**

v.

**DAVID L. LADD, Commissioner of Patents,
Appellee.**

PETITION FOR REHEARING

Appellants respectfully petition for rehearing under
Rule 26 of this Court.

The Ground for the Petition

The ground for the petition is that the majority of
the Court misunderstood Claim 2 in holding that it is
"worded too broadly" and "is not limited to a structure
essential to accomplish the advantage claimed for the
invention" (p. 4 of the opinion).

Appellants respectfully submit that Claim 2 is of
proper scope to define Murton's invention and does not
cover structures outside the invention.

2 *The Majority and Dissenting Opinions.*

**The Portions of the Opinions of the Court
Here Involved**

The majority opinion states (p. 4):

"Its terms [the terms of Claim 2] can be applied to structures which are quite different from Murton's; that is to say, the critical limitation 'said means being the sole means overlying the lateral projection at the bottom of the rod', while it may describe Murton's invention it also describes structures other than Murton's. Thus Claim 2 is worded too broadly. It is not limited to a structure essential to accomplish the advantage claimed for the invention. That advantage does not attach to other structures covered by the language of the claim. This is the basis for disallowance of the claim."

The dissenting opinion of Judge Burger states (p. 6):

"We are not told by the majority how or why that Claim is too broadly worded but are presented only with a naked assertion of a conclusion. Possibly the majority is relying on Appellee's drawings, based on Claim 2, which show a structure that does not remove the sleeve load from the head as the Claim urges. Since the asserted advantage of the Claim is inconsistent with Appellee's drawings, if the advantageous construction is revealed to one skilled in the art by the language of the Claim, then the drawings of Appellee are not accurate expressions of what Appellant's Claim represents."

Argument

Appellee's drawings (pp. 13 and 14 of appellee's brief), which evidently led to the above quoted passage from the majority opinion, are misleading because, while they illustrate structures which are forms which Murton's invention may take, they include, *in addition*, elements which are *not in Claim 2* and which depart from, and indeed are diametrically opposed to, Murton's teaching and vitiate the invention.

Claim 2, which is set forth on page 2 of the opinion, defines a combination of *three* elements:

- (1) a head
- (2) a rod having a lateral projection at its bottom
- (3) an insert which attaches the rod to the head and is the sole means overlying the lateral projection at the bottom of the rod.

The claim does *not* include a sleeve, while appellee's drawings *do* include sleeves which appellee has arbitrarily seated on the top of the head contrary to Murton's teaching. See Murton's Fig. 6, reproduced at page 79 of the joint appendix. The sleeve 18 seats on the insert 9a, *not* on the head 2a. This is the purpose of making the insert the *sole* means overlying the rod flange—so that the insert is *exposed* to the bottom sleeve enabling the thrust of the sleeves to be taken by the insert and transmitted by the insert to the rod flange, freeing the head of the thrust. See the *undisputed* testimony of expert witness Sergy at pages 32 and 163 of the joint appendix reproduced at page 10 of appellants' reply brief.

Appellee's drawings show inserts which are confined to the bottom of the well of the head. This is in accordance with Murton's invention as the claim is not limited as to how far up the wall of the well the insert extends, so long as it is the *sole* means overlying the rod flange. The form of insert shown in Fig. 6 (JA 79) extends *above* the top of the head. The form of insert shown in Fig. 5 (JA 77) extends *flush* with the top of the head. Murton did not choose to show another form, but he might, for example, have shown his Fig. 5 insert stopping short of the top of the head. It would still have served the purpose with a sleeve designed to cooperate with the insert, i.e., a sleeve having a downward projection to extend inside the head downwardly to the insert.

We here reproduce a portion of Sergy's testimony which appeared partly at page 9 and partly at page 12 of our main brief but which we may not have sufficiently stressed in our argument to the Court (JA 27-8):

"Q. You have stressed the fact that the Murton insert in either form serves to support the sleeves and transfer their thrust to the rod flange freeing the stopper head from the thrust of the sleeves.

"Is this disclosed in the Murton Application?

A. Yes, the sleeve shown in figure 6 is 18. It is shown resting directly on the insert 9-A. The insert 9-A projects upward and receives the thrust of the sleeve.

"Q. No sleeve is shown in figure 5. Is the teaching of that figure different than the teaching of figure 6? A. No, the teaching in that figure is the same. In this particular case the insert is noted to be flush with the top of the head. However, a sleeve suitable for this application is a matter of design.

"In this particular case a sleeve with a downward angular projection would dispose about the rod and rest on the insert.

"Q. Murton's claims do not mention the sleeves. As a person skilled in the art, does this affect your understanding of the Murton invention?
A. No, it doesn't.

"The ability of the insert to support the sleeves thereby transmitting the thrust through the rod flange is an *advantage** of the Murton invention.

"Murton claims a *structure* which produces this *advantage*, enabling the insert to support the sleeves and thereby transfer the thrust to the rod flange."

This may be the "uncontradicted expert testimony" referred to by Judge Burger (p. 5).

Following Sergy's testimony we submitted at page 15 of the reply brief for appellants a modification of appellee's Fig. A. We ask the Court to compare appellee's Fig. A at page 13 of appellee's brief with our modification of that figure at page 15 of appellants' reply brief. *These two figures demonstrate the issue in this case.*

Bearing in mind that Claim 2 in issue does not include any sleeve in the claimed combination, *appellants'* Fig. A illustrates Murton's invention employed as taught by Murton while *appellee's* Fig. A shows Murton's invention emasculated by the seating of the sleeve on the stopper head while by selecting a sleeve with a downward projection in accordance with Sergy's testimony the thrust of the sleeve may be transmitted through the insert to the rod flange as illustrated by appellants' Fig. A.

*Italics in quotations ours throughout this petition.

The advantage of any invention can be lost by using the invention contrary to the way it is intended to be used. The presentation by appellee of drawings showing how *not* to use the invention does not make Murton's claim too broad. As Sergy testified, Murton claims a *structure* which when properly used produces the advantage of the invention. This is still true despite appellee's use of that structure contrary to Murton's teaching and in a way such that the advantage is lost.* So far as the elements of the claim are concerned they are all that are necessary to accomplish the benefits of the invention when used in accordance with Murton's teaching.

A parallel illustration would be an electric light bulb covered by a claim defining elements combined to adapt the bulb for use with alternating current. The fact that the bulb would not light when screwed into a socket supplied with direct current would not make the claim too broad.

The Supreme Court said in *Deering v. Winona Harvester Works*, 155 U.S. 286, 302, cited at page 25 of appellants' main brief, "... any appropriate means for making it operative will be understood". If the "appropriate means" can be understood from the disclosure by an expert in the art that is sufficient: *Hazeltine Research, Inc. v. Dage Electric Company, Inc.* (C.A. 7-1959), 271 F.2d 218, 220-1, cited by Judge Burger (p. 6). We again respectfully refer to Sergy's testimony quoted above at pages 4 and 5.

*Judge Burger correctly appraised the situation in his statement (p. 6 of dissenting opinion): "Since the asserted advantage of the Claim is inconsistent with Appellee's drawings, if the advantageous construction is revealed to one skilled in the art by the language of the Claim, then the drawings of Appellee are not accurate expressions of what Appellant's Claim represents."

Claim 2 Is Proper in Form and Substance.

7

It is respectfully pointed out that the cases cited at the end of the majority opinion (p. 5), *Dyer v. Coe*, 75 U.S. App. D.C. 125, 130, 125 F. 2d 192, 197, and *Seyfarth v. Coe*, 76 U.S. App. D.C. 96, 99, 129 F. 2d 58, 61, do not require mention in the claim itself of the structural *advantage* alleged. Both cases turned on lack of sufficient definition of the invention in the claims. In the present case Claim 2 includes *exactly* the elements required to accomplish the advantages of the invention when used as taught by Murton.

Conclusion

It is respectfully submitted that Claim 2 is proper in form and substance to define Murton's invention and that any structure responding to the terms of the claim, in which the insert is the sole means overlying the lateral projection at the bottom of the rod so as to expose the insert to receive the downward thrust of appropriately formed sleeves in accordance with Murton's teaching and thus relieve the head of the sleeve thrust, *including the forms of appellee's drawings*, is a form of Murton's invention. The whole difficulty in this case has been due to the showing in appellee's drawings of sleeves seated on the stopper head (the sleeves not being elements of the claimed combination) directly contrary to Murton's teaching.

It is submitted that on the record the appellants are entitled to a mandate to the District Court to enter a final judgment that Claim 2 of the Murton application is patentable and that Vesuvius is entitled to receive a

Certificate of Counsel.

patent thereon and authorizing appellee to issue such patent on compliance with the requirements of law.

Respectfully submitted,

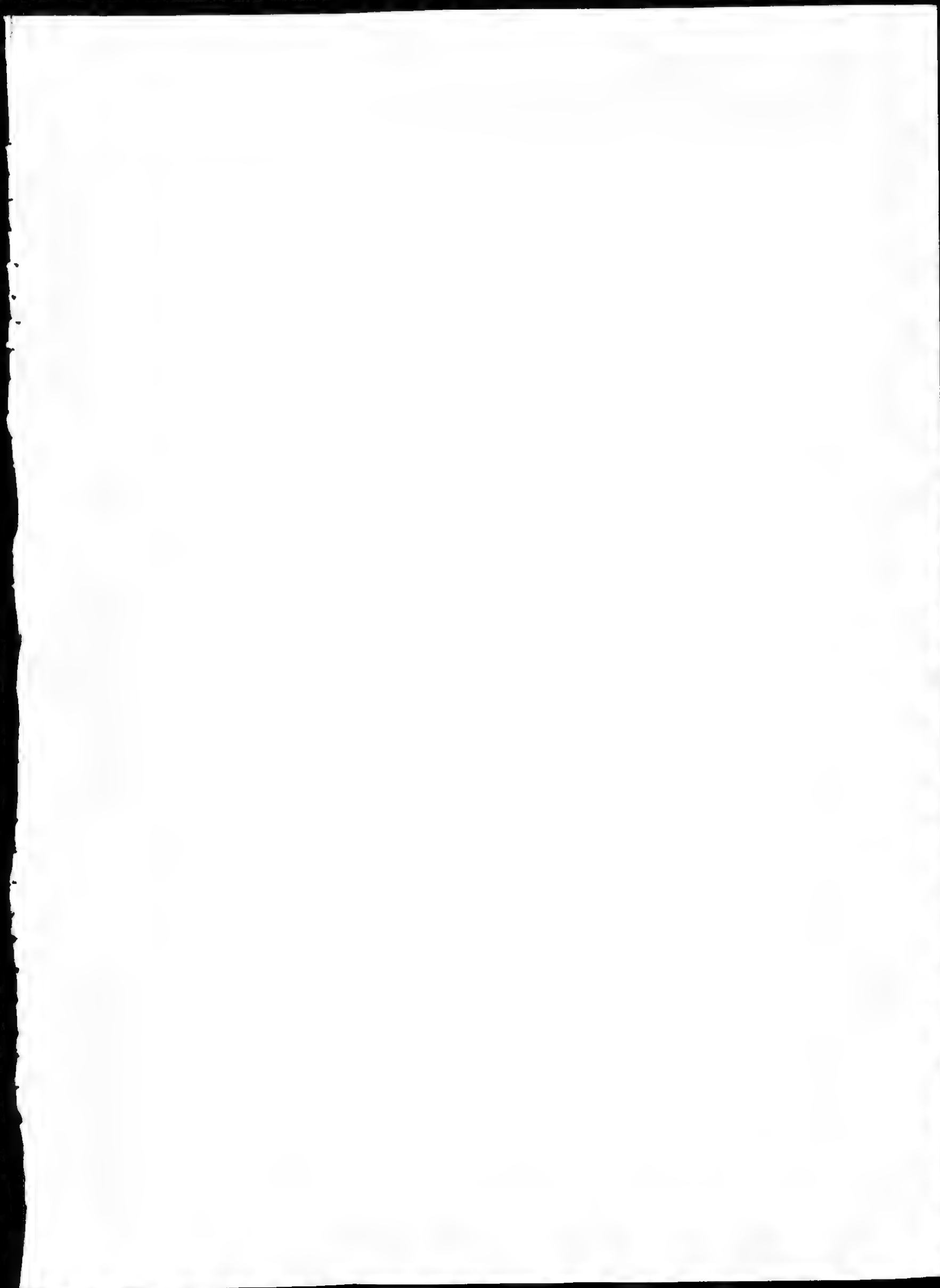
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October 12, 1965.

CERTIFICATE OF COUNSEL

We certify that the foregoing petition is presented in good faith and not for delay.



ANSWER TO PETITION FOR REHEARING

United States Court of Appeals
FOR THE DISTRICT OF COLUMBIA CIRCUIT

Appeal No. 19,083

CRAWFORD B. MURTON and VESUVIUS CRUCIBLE
COMPANY, APPELLANTS

v.

DAVID L. LADD, COMMISSIONER OF PATENTS,
APPELLEE

Appeal From the Judgment of the United States
District Court for the District of Columbia

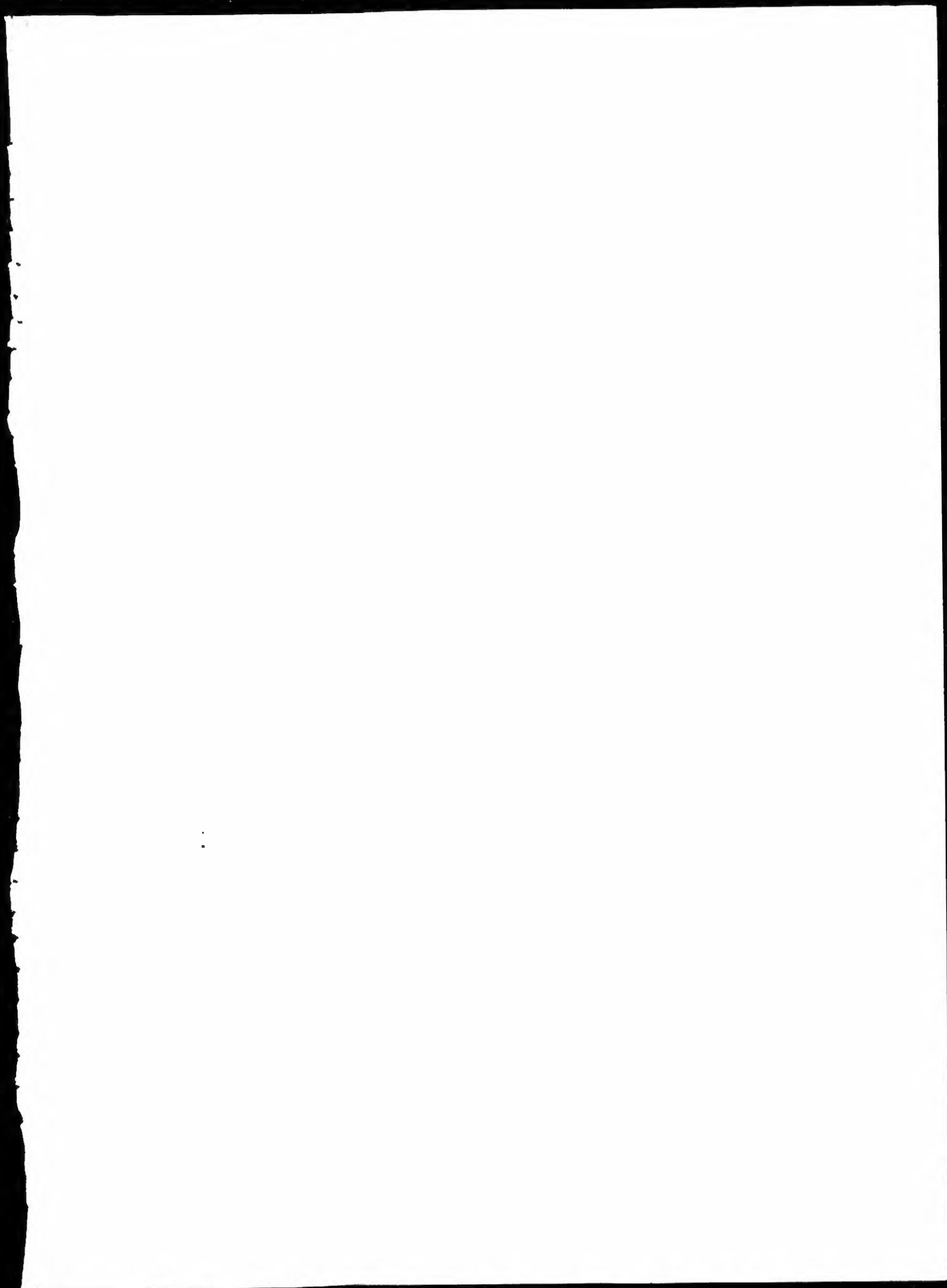
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FILED OCT 22 1965

Nathan J. Paulson
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United States Court of Appeals
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Appeal No. 19,083

**CRAWFORD B. MURTON and VESUVIUS CRUCIBLE
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v.

**DAVID L. LADD, COMMISSIONER OF PATENTS,
APPELLEE**

**APPELLEE'S ANSWER TO PETITION FOR
REHEARING**

Under Rule 26(b) appellee opposes the appellants' petition for rehearing.

Most of the argument in support of appellants' petition for rehearing is merely repetition of arguments previously made.

The District Court made the following finding of fact (J.A. 174; appellee's brief, page 16):

This advantageous construction, however, does not appear to be directly set forth in the specification, and is certainly not recited by the claims.

In view of the emphasis by appellants on alleged pertinent but not clearly identified expert testimony contrary to the above quoted finding of fact, the following is noted:

It is well settled that it is the function of the court and not of experts to determine the meaning of claims, but that the court may accept the testimony of experts as to the meaning to those skilled in the art of terms of art in the claims. *Seymour v. Osborne*, 11 Wall. 516, 546; *Heald v. Rice*, 104 U.S. 737, 749; *Singer Mfg. Co. v. Cramer*, 192 U.S. 265, 275; *U. S. Industrial Chemicals, Inc. v. Carbide and Carbon Chemicals Corp.*, 315 U.S. 668; *Kohn v. Eimer*, (2nd Cir.) 265 F. 900; *Minnesota Mining & Mfg. Co. v. Carborundum Co.* (3rd Cir.), 155 F.2d 746; *Thabet Mfg. Co. v. Koolvent Mold Awning Corp. of America* (6th Cir.), 226 F.2d 207; *General Motors Corp. v. Estate Stove Co.* (6th Cir.), 203 F.2d 912; *Solomon v. Renstrom* (8th Cir.), 150 F.2d 805. Where there are no terms of art and only layman's language in the claims, expert testimony is to the trial judge (in the words of Judge Learned Hand in *Kohn v. Eimer*, *supra*) "a burdensome impertinence."

Appellants' claim 2 clearly involves no terms of art and recites only layman's language. That language is clear and unambiguous. Any alleged uncontradicted testimony relevant to the meaning of the claim was not controlling upon the trial judge.

The above quoted finding of fact of the District Judge is a clear and unambiguous finding and satisfies the requirements for findings as set forth by

this Court in *Schilling v. Schwitzer-Cummins Co.*, 79 U.S. App. D.C. 201, 142 F.(2d) 82.

There is no showing of clear error in the above quoted finding of fact such as is required for setting it aside. See Rule 52(a), F.R.C.P., and *Abbott v. Coe*, 71 App. D.C. 195, 109 F.2d 449.

Given the above quoted finding of fact, the lack of a conclusion of law of unpatentability specifically on the basis of only that finding is immaterial since, once the finding was entered, the specific conclusion of law of unpatentability followed by operation of the statute, 35 U.S.C. 112, paragraph 2, and the complaint was properly dismissed as to appealed claim 2.

It is further noted that under 35 U.S.C. 112, par. 1, it is the function of the specification to disclose the invention to those skilled in the art and that under 35 U.S.C. 112, par. 2, it is the function of the claims to indicate to the public the limits of the patent monopoly.

CONCLUSION

It is submitted that the majority opinion is clearly correct and that the petition for rehearing should be denied.

Respectfully submitted,

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